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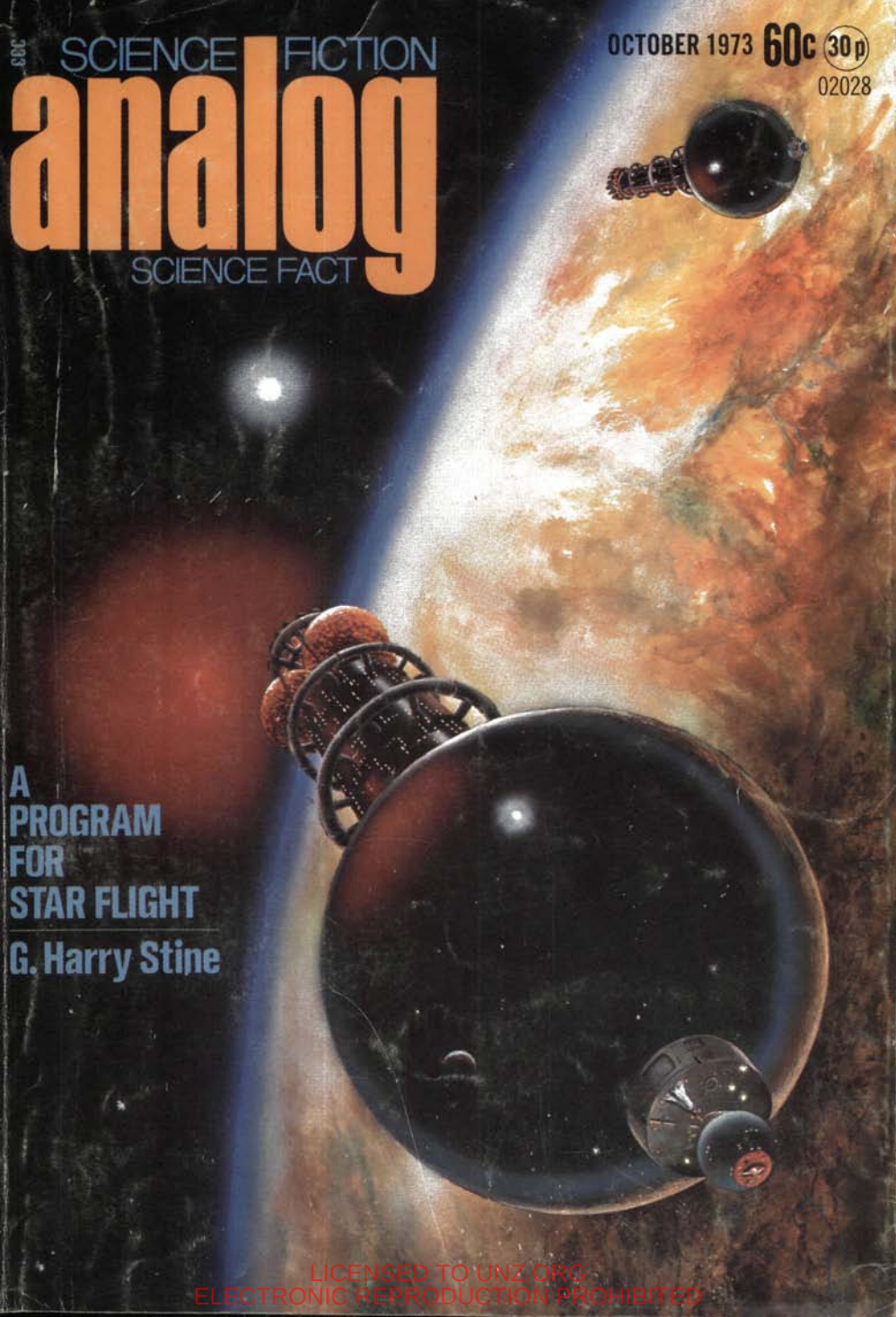

A PROGRAM FOR STAR FLIGHT

G. Harry Stine

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experiments in utopias by Carl Sagan

Editor's note: The lead article this month, and the cover illustration, are dedicated to the topic of interstellar flight. G. Harry Stine shows how the first programs of interstellar exploration and colonization can be planned, and Rick Sternbach shows us what a starship might look like, based on the best existing scientific information.

This Guest Editorial is actually an excerpt from Carl Sagan's newest book, "The Cosmic Connection: An Extraterrestrial Perspective." Most of Analog's readers already recognize Dr. Sagan's name. He is one of the world's leading astronomers, and has devoted much of his career to establishing the scientific bases for searching for life on other worlds. Much of his work has involved studies of Mars, and his researches have taken him into the widely diverse disciplines of biochemistry, geology, meteorology, and even terraforming.*

In assessing the likelihood of advanced technical civilizations elsewhere in the Galaxy, the most important fact is the one about which we know least—the lifetime of such a civilization. If civilizations destroy themselves rapidly after reaching the technological phase, at any given moment (like now) there may be very few of them for us to contact. If, on the other hand, a small fraction of civilizations learn to live with weapons of mass destruction and avoid both natural and self-generated catastrophes, the number of civilizations for us to communicate with at any given moment may be very large.

This assessment is one reason we are concerned about the lifetime of such civilizations. There is a more pressing reason, of course. For personal reasons, we hope that the lifetime of our own civilization will be long.

There is probably no epoch in the history of mankind that has undergone so much and so many varieties of change as the present time. Two hundred years ago, in-

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formation could be sent from one city to another no faster than by horse. Today, the information can be sent via telephone, telegraph, radio, or television at the velocity of light. In two hundred years the speed of communication has increased by a factor of thirty million. We believe there will be no corresponding future advance, since messages cannot, we believe, be sent faster than the velocity of light.

Two hundred years ago it took as long to go from Liverpool to London as it now does from the Earth to the Moon. Similar changes have occurred in the energy resources available to our civilization, in the amount of information that is stored and processed, in methods of food production and distribution, in the synthesis of new materials, in the concentration of population from the countryside to the cities, in the vast increase in population, in improved medical practice, and in enormous social upheaval.

Our instincts and emotions are those of our hunter-gatherer ancestors of a million years ago. But our society is astonishingly different from that of a million years ago. In times of slow change, the insights and skills learned by one generation are useful, tried, and adaptive, and are gladly received when passed down to the next generation. But in times like today, when the society changes significantly in less than a human lifetime, the parental insights no longer have unquestioned validity for the young. The so-called generation gap is a consequence of the rate of social and technological change.

Even within a human lifetime, the change is so great that many people are alienated from their own society. Margaret Mead has described older people today as involuntary immigrants from the past to the present.

Old economic assumptions, old methods of determining political leaders, old methods of distributing resources, old methods of communicating information from the government to the people—and vice versa—all of these may once have been valid or useful or at least somewhat adaptive, but today may no longer have survival value at all. Old oppressive and chauvinistic attitudes among the races, between the sexes, and between economic groups are being justifiably challenged. The fabric of society throughout the world is ripping apart.

At the same time, there are vested interests opposed to change. These include individuals in power who have much to gain in the short run by maintaining the old ways, even if their children have much to lose in the long run. They are individuals who are unable in middle years to change the attitudes inculcated in their youth.

The situation is a very difficult

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one. The rate of change cannot continue indefinitely; as the example of the rate of communication indicates, limits must be reached. We cannot communicate faster than the velocity of light. We cannot have a population larger than Earth's resources and economic distribution facilities can maintain. Whatever the solutions to be achieved, hundreds of years from now the Earth is unlikely still to be experiencing great social stress and change. We will have reached some solution to our present problems. The question is, which solution?

In science a situation as complicated as this is difficult to treat theoretically. We do not understand all the factors that influence our society and, therefore, cannot make reliable predictions on what changes are desirable. There are too many complex interactions. Ecology has been called the subversive science because every time a serious effort to preserve a feature of the environment is made, it runs into enormous numbers of social or economic vested interests. The same is true every time we attempt to make a major change in anything that is wrong: the change runs through society as a whole. It is difficult to isolate small fragments of the society and change them without having profound influences on the rest of society.

When theory is not adequate in science, the only realistic approach is experimental. Experiment is the touchstone of science on which the theories are framed. It is the court of last resort. What is clearly needed are experimental societies!

There is good biological precedent for this idea. In the evolution of life there are innumerable cases when an organism was clearly dominant, highly specialized, perfectly acclimatized to its environment. But the environment changed and the organism died. It is for this reason that nature employs mutations. The vast majority of mutations are deleterious or lethal. The mutated species are less adaptive than the normal types. But one in a thousand or one in ten thousand mutants has a slight advantage over its parents. The mutations breed true, and the mutant organism is now slightly better adapted.

Social mutations, it seems to me, are what we need. Perhaps because of a hoary science-fiction tradition that mutants are ugly and hateful, it might be better to use another term. But social mutation—a variation on a social system which breeds true, which, if it works, is the path to the future—seems to be precisely the right phrase. It would be useful to examine why some of us find the phrase objectionable.

We should be encouraging social, economic, and political experimentation on a massive scale in all countries. Instead, the opposite seems to be occurring. In countries such as the United States or the

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Soviet Union the official policy is to discourage significant experimentation, because it is, of course, unpopular with the majority. The practical consequence is vigorous popular disapproval of significant variation. Young urban idealists immersed in a drug culture, with dress styles considered bizarre by conventional standards, and with no prior knowledge of agriculture, are unlikely to succeed in establishing utopian agricultural communities in the American Southwest—even without local harassment. Yet such experimental communities throughout the world have been subjected to hostility and violence by their more conventional neighbors. In some cases the vigilantes are enraged because they themselves have only within the previous generation been accepted into the conventional system.

We should not be surprised, then, if experimental communities fail. Only a small fraction of mutations succeed. But the advantage social mutations have over biological mutations is that individuals learn; the participants in unsuccessful communal experiments are able to assess the reasons for failure and can participate in later experiments that attempt to avoid the causes of initial failure.

There should be not only popular approval for such experiments, but also official governmental support for them. Volunteers for such experiments in utopia—facing long odds for the benefit of society as a whole—will, I hope, be thought of as men and women of exemplary courage. They are the cutting edge of the future. One day there will arise an experimental community that works much more efficiently than the polyglot, rubbery, hand-patched society we are living in. A viable alternative will then be before us.

I do not believe that anyone alive today is wise enough to know what such a future society will be like. There may be many different alternatives, each potentially more successful than the pitifully small variety that face us today.

A related problem is that the non-Western, nontechnological societies, viewing the power and great material wealth of the West, are making great strides to emulate us—in the course of which many ancient traditions, world-views, and ways of life are being abandoned. For all we know, some of the alternatives being abandoned contain elements of precisely the alternatives we are seeking. There must be some way to preserve the adaptive elements of our societies—painfully worked out through thousands of years of sociological evolution—while at the same time coming to grips with modern technology. The principal immediate problem is to spread the technological achievements while maintaining cultural diversity.

continued on page 177

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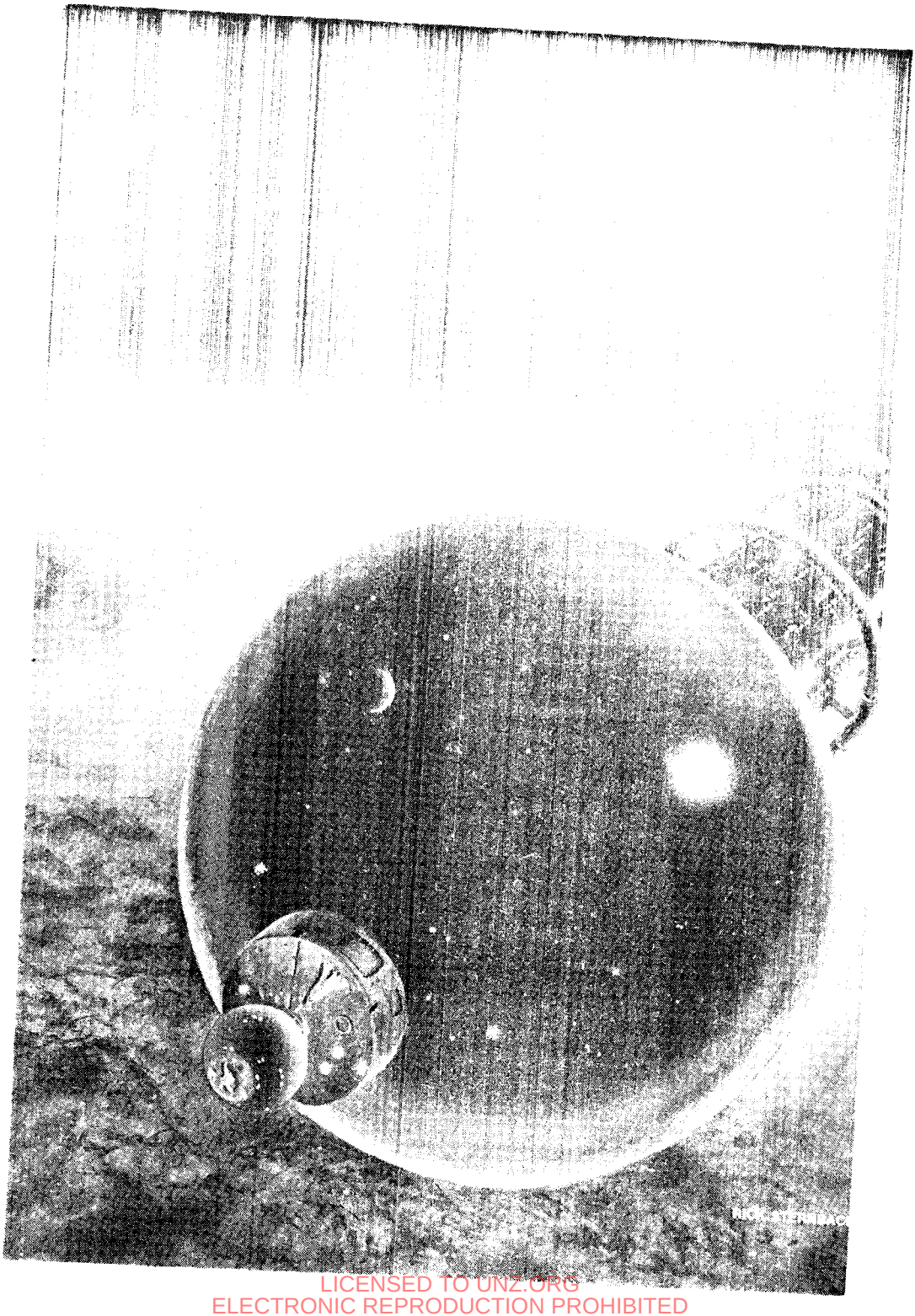

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"To the stars!"

How many times has that clarion cry rung through the halls of science fiction? How many great stories have been built around that call to adventure beyond our ken?

But how many people have ever seriously thought about what would be required, how it could be done, and what a star-flight program might look like?

To me, more than half the fun of working out an SF yarn is getting there, figuring out the whys and wherefores of the background, providing a set against which the characters of the story can play. It also happens that there are some organizations around these days who are interested in speculating about the future and in developing scenarios in order to evaluate possible options. Considerable expertise has been developed in the structuring and programming of scenarios.

Suppose we were to apply some of these forecasting and programming techniques to some classic SF situations. Would they provide us with some new options upon which to base new stories? Would they give us some new twists? Would they provide some new conflict situations for our characters?

One of the most challenging of the classic SF themes to investigate is star flight. The rules of the game say we have to start with what we know now or with things that are amenable to engineering development. In other words, for the purposes of this exercise, we must rule out faster-than-light journeys to the stars. We should also rule out cryohibernation of the crew. In other words, we have the classic situation of Heinlein's "Universe" and van Vogt's "Centaurus II." Star flight with very large ships lasting perhaps for several generations.

At this point, we must stop and request justification. Now and later, somebody is going to raise his voice in the question, "Why fly to the stars?"

If you had asked me the same question about going to the Moon twenty years ago, I could have given you many plausible reasons. I might not have given you the reason behind the real program, or if I had enumerated that reason it might have been far down the list of priorities. Now, when the same question is asked about star flight, I hesitate somewhat. However, I can list at least eight reasons why the human race will go to the stars someday. There may be other reasons, but these appear to be the main ones at this time in history:

1. *Species survival.* Old Sol could show disturbing signs of an impending nova. Or we could louse-up Earth beyond the ability of the ecology to recover.

2. *Information.* The current anti-technology cult to the contrary, we need information about our universe and ourselves in order to survive better.

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3. *Life search.* What we discover exploring the Solar System *vis-à-vis* life or the absence thereof may impel us to go to the stars.

4. *Intelligence search.* Is there anybody else out there? We may get a partial answer to this in the next fifty years, but we may have to go to the stars to get the full answer.

5. *Liebensraum.* There's a lot of space out there. Where mankind has technology and matter, he can manage to live. There actually may be more living space out there than we imagine.

6. *Sociological research.* Starships will be very large vessels inhabited by thousands of people. They will operate in near isolation for many years. They may provide the only laboratories for viable and meaningful sociological research.

7. *Ideological reasons.* New England was settled because of this, so don't discount it. If starships become available, groups of people may decide to go elsewhere for ideological reasons.

8. *Economics.* Even today, lots of terrestrial exploration still goes on, and it goes on for economic reasons. If somebody can make some money because of interstellar exploration, we can be certain it will be accomplished. Don't discount the profit motive; a lot gets done or fails to get done because of it.

These are *general reasons,* and I won't attempt to assign priorities to them or even try to guess which one, if any, will be the final justification used. I refuse to do this because I have a built-in cultural bias. I am an American who speaks and thinks in the English language and who has an Anglo-Hellenic cultural heritage. Star flight may be accomplished by another culture for reasons that would seem absurd to Americans. In other words, don't assume that star flight won't be done because we have lost our nerve, drive, or ambition—because you are speaking strictly of our culture. When it comes time to go, those who man the starships may be from a renascent culture on the make with fire in their guts.

For the sake of argument, let us assume that star flight will be done. Let us also assume that whoever does it will rely pretty much on our technological heritage and will use the programming know-how that we developed during the Industrial Revolution and carried to a high pitch of perfection in Project Apollo.

First of all, it would be quite illogical to simply build a starship, fill it with people, and send it off to Alpha Centauri. We didn't get to the Moon in this manner. Nor did we conduct Operation Deep Freeze this way. Nor did the British conquer Mount Everest by sending out two men with back packs from London.

There will have to be a program for Project Star Flight.

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A program is a step-by-step logical linear development plan, a road map to indicate how to get from here to where you want to go. There are likely to be sub-programs within the program itself, phases through which the program must go and which can be almost distinct programs themselves.

Phase One of Project Star Flight thus concerns itself with destinations, with finding the target, with a search.

Actually, we've already started.

Dr. Stephen H. Dole has made a very thorough study of the possibilities of habitable planets, and I highly recommend his book listed in the bibliography at the end of this article.

According to Dr. Dole, there are 14 stars within a distance of 22 light-years that are of spectral classes M2 to F2 and therefore must have masses ranging from 0.35 to 1.43 solar masses. These are stellar sizes that would permit habitable planets at suitable distances from the primary.

Dr. Dole estimates that there is a 43 percent probability of at least one habitable planet around one of the 14 stars within 22 light-years of the Sun.

This is very exciting and encouraging information.

It could start us on Phase One. We could go looking for it . . . literally.

Phase One of Project Star Flight involves just looking.

With only 14 targets to scrutinize, it is an easier job than Project Ozma was. But we have to get off of the Earth to do it.

To search for extrasolar planets, we must operate free of the terrestrial atmosphere. It smears images and creates distortion because of its constant motion and density differences. It is also a highly effective filter in certain regions of the elec-

ENZMANN STARSHIP

A starship will be big. *As we can conceive of it today with existing technology or with technology that is within our grasp, a starship might look like this, according to Dr. Robert D. Enzmann. The modular concept would be used throughout so that a damaged module could be "unplugged" from the starship or modules could be "plugged into" other starships. The basic unit is a life module 300 feet in diameter and 300 feet long. Three of them are coupled end to end. At the aft end of the starship are the engineering modules and 12 to 24 Orion-type thermonuclear pulse propulsion units. The propellant for the Orions is stored in a "snowball" of frozen deuterium 1000 feet in diameter on the front of the starship. Running fore and aft is the "backbone" of the starship, a central load-bearing core 50 feet in diameter. One of the "primitive" Saturn-V vehicles is shown for comparison. Two Empire State Buildings atop one another would be just a little taller than the starship is long. The starship will be assembled in orbit!*

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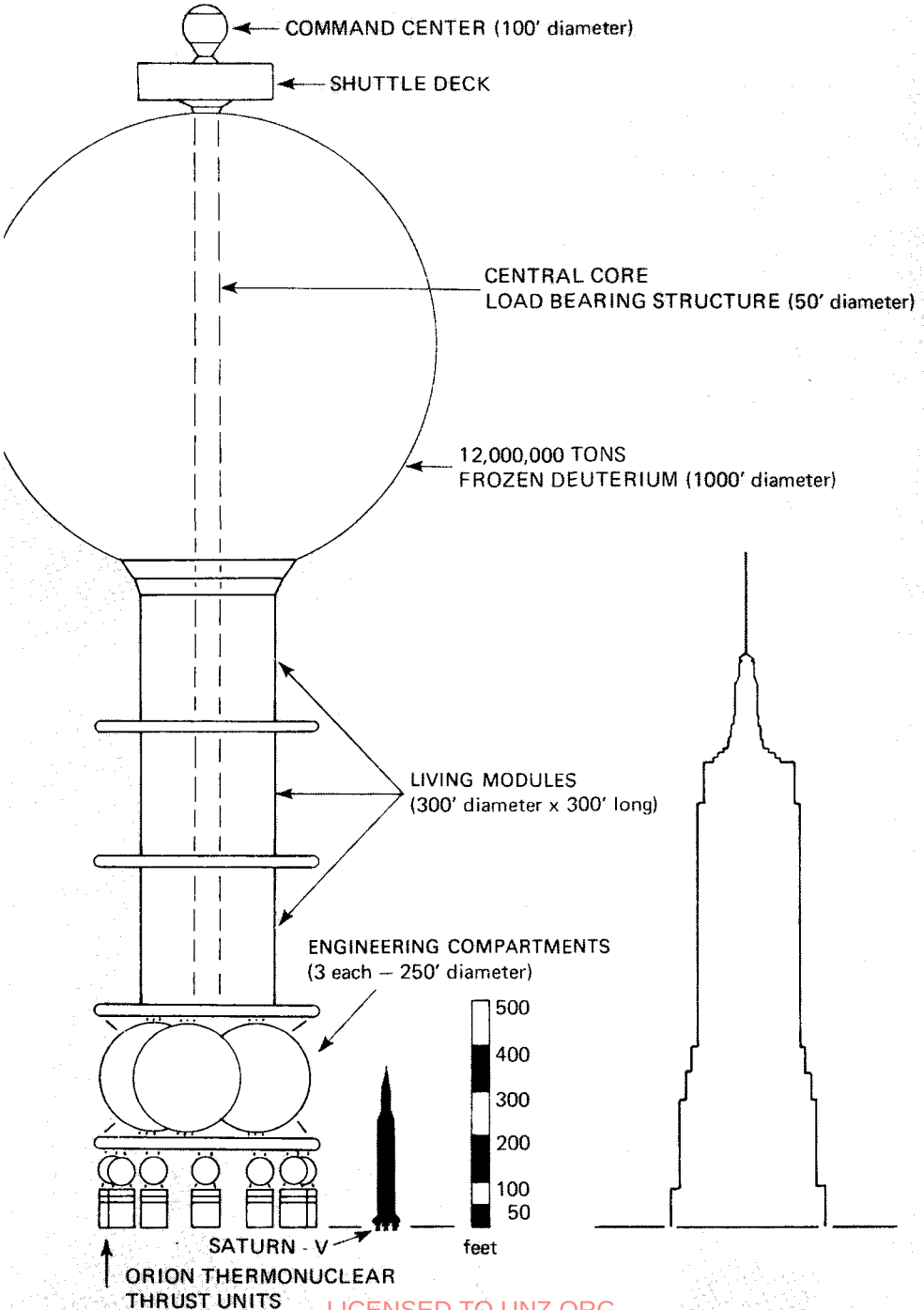

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tromagnetic spectrum that astronomers will wish to scan during Phase One.

So when we build those big telescopes in near-Earth orbit (NEO) and on the Moon in the next 25 years, we have a major research program of significance all ready for them.

The various methods of photometric observation of planets at interstellar distances were thoroughly discussed by A. T. Lawton in the B.I.S. publication, "Spaceflight." Two methods appeared to be possible. Of these, measurement of the perturbations of a star's proper motion has been proven, but it takes from 20 to 50 years in most cases to amass enough data to be significant. The second method was cited by Lawton as the most feasible: direct photometric observation of the optical radiation from the extrasolar planet. We can't do this on the Earth's surface because of our atmosphere and because of the Earth's gravity.

The atmosphere scatters too much light, and the terrestrial gravity effectively limits the practical size of the telescope's optical parts, such as mirrors.

When we have built telescope mirrors up to 90 meters (3,500 inches) in diameter in space—and this is possible with existing materials and technology—we would be able to see a planet the size of Jupiter orbiting Alpha Centauri 4.3 light-years away.

Utilizing electronic techniques and computer enhancement methods already in existence, as well as observing in the two-to-five-micron infrared region, we could extend this capability out to 25 light-years—more than enough for the purposes of Project Star Flight.

If we are willing to speculate a bit in the technical area, other methods of detecting interstellar planets could be considered. For example, if we possessed a spectrometer with suitably high resolution, it might be possible to detect planets by the periodic shift in the star's spectrum caused by the gravitational fields of the planets—but we would also need some method of determining which shifts were due to planets and which to normal changes in the stellar atmosphere.

Be that as it may, with the technology and capabilities that we can foresee in the next 10 to 25 years, the chances are good of detecting extrasolar planets. In view of the pre-observational estimate of a 43 percent probability mentioned earlier, the effort seems worthwhile.

(How do we sell it to the man in the street? We'd better figure it out. If we don't, the scientific paper announcing the first observation is likely to be written in a language other than English.)

For the sake of our discussion here, let us suppose that Dr. Dole has fed the right program elements into his computer and that his 43 percent probability is correct. Let

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us suppose that the NEO observatories find six nearby stars that appear to have planets.

Before we blast off with manned interstellar ships toward these likely targets, we should have confirmation and more information. We should also begin to develop our capability to build interstellar vehicles and to communicate over interstellar distances. Let us use the new exploration tool of the unmanned space probe. This is Project Star Flight Phase Two.

In Phase Two three unmanned interstellar probes will be launched toward each of the six target stars. These probes will be the great-grandchildren of the then-primitive Mariners and Grand Tour spacecraft. They will be much, much larger, so big that we will have to build them in orbit. In the fields of reliability, component and systems lifetimes, propulsion, and communications, they will pose the same kind of technical challenge as the Mariners—but of a higher degree.

Reliability and long lifetimes are a matter of proper design, proper fabrication, and the utilization of redundant and self-repairing components. We have a lot to learn here, but we're learning now.

There are several types of reaction propulsion systems that could be applied to the interstellar probes. Chemical rockets and Nerva-type nuclear rockets are not usable because of their low specific impulse. Ion rockets could not be considered because of their low thrust and the resulting extended flight time. Two systems appear to be suitable candidates: the photon rocket and the nuclear-pulse rocket.

Unfortunately, nobody has the slightest idea of how to build a photon rocket this year. Perhaps it is one of the jobs that a laser can do. Perhaps it will be laser-like in its operation. Anything with the energy density and power capabilities of the laser is fair grist for our speculative mill, and we have not seen the end of the space uses of the laser. I am not willing to consign the photon rocket to the Impossible Device File because of the laser. But we don't know how to make a photon rocket today, and therefore our ground rules label it a no-no for further consideration now.

But we do know how to build the nuclear-pulse rocket.

In the early 1960's, the concept of the nuclear-pulse rocket and some of the basic research were developed and tested under the aegis of Project Orion. The idea was to make use of the shock wave of a nuclear blast for propulsion. A nuclear or thermonuclear device is tossed out of the back end of the ship and detonates behind the vehicle. Researchers envisioned large pusher plates mounted on shock absorbers on the rear end of the space vehicle. The shock wave of the explosion would drive the ve-

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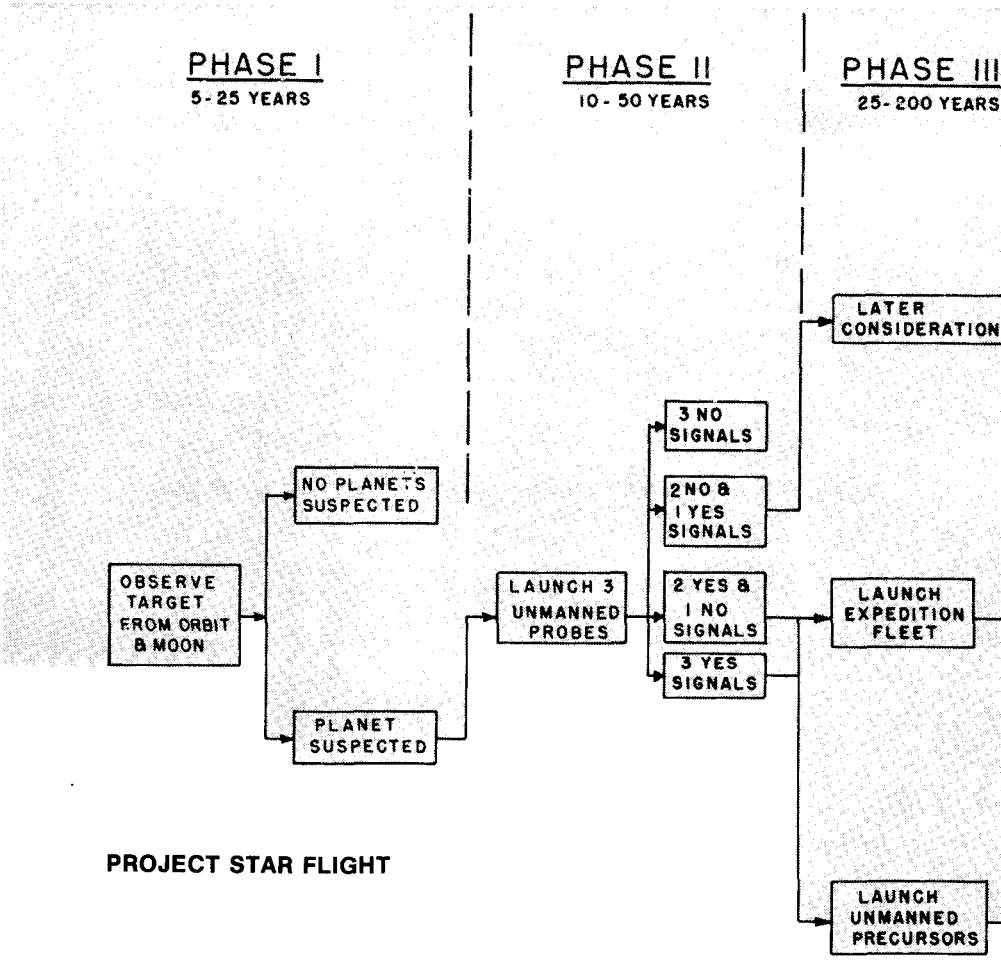

PROJECT STAR FLIGHT

hicle forward. The concept is a valid one because Theodore B. Taylor of Project Orion reported that flight tests were actually made near San Diego using a small vehicle and conventional chemical explosives. The Nuclear Test Ban Treaty put a stop to Project Orion, and it now rests on the back shelf of technology for possible future use. Since it was not possible to conduct live nuclear tests of Orion in the Earth's atmosphere, the concept is waiting until we can test it in open space beyond the Earth-Moon system.

The late Dandridge M. Cole foresaw an even more efficient nuclear-pulse rocket. If one could contain the entire nuclear explosion inside a very large spherical chamber, more thrust and higher specific

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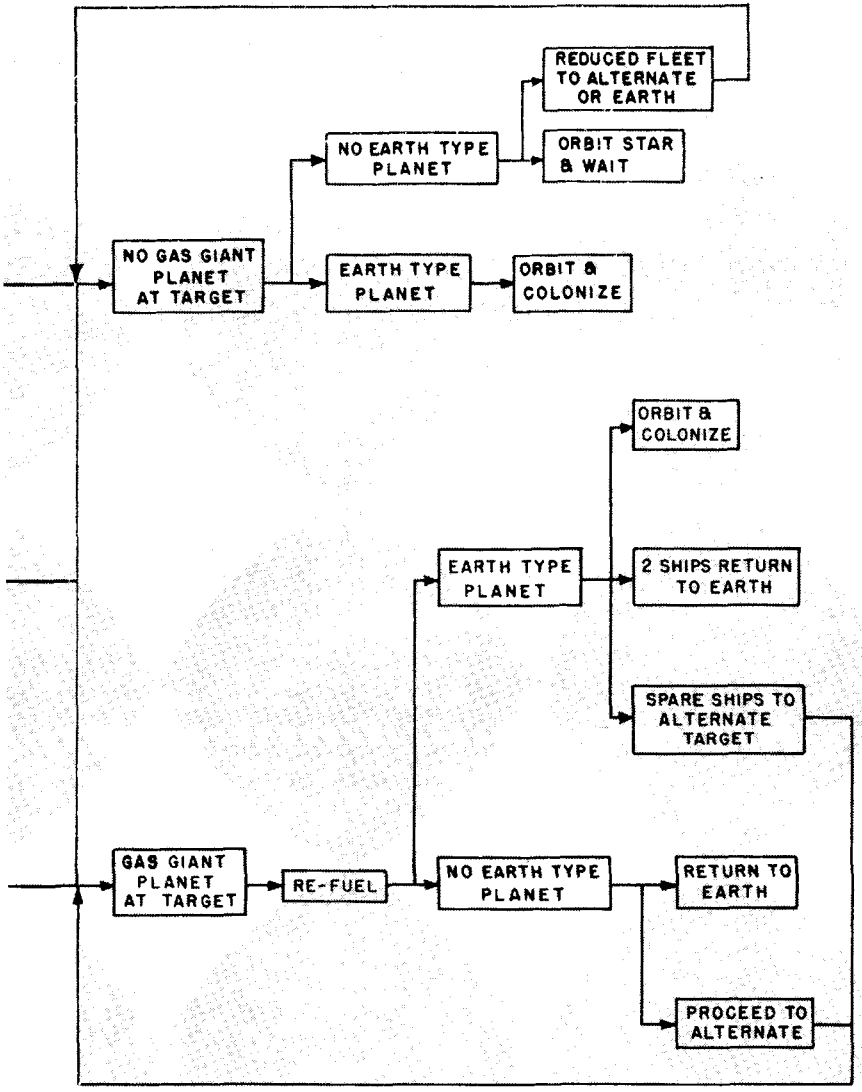

impulse could be generated by venting the explosive force through a large rocket-like nozzle on the aft end of this gargantuan chamber. Containing the explosion of a thermonuclear device may be a staggering idea to most people, but to an engineer it is just numbers. Give the idea to an engineer, and he'll design it with an adequate safety

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factor and also determine how to make it. Engineers don't get excited by big numbers or big gadgets.

Preliminary work on Project Star Flight Phase Two could get under way by taking the wraps off Project Orion, refining it in light of developing technology, and testing it in space during the next 10 to 20 years. Nuclear radiation in the Solar System isn't new; the average small solar flare burps out more radiation than our largest conceivable thermonuclear device.

Thus, by the late 1980's or early in the 1990's, we would be starting to build up to 18 unmanned interstellar probes. Obviously, Project Star Flight is almost completely a space-based operation. Everything is NEO-built. The large Phase One NEO-telescopes were—and the interstellar probes will be—so large that they will be space-born as well. Preliminary calculations indicate a gross Earth-weight of about a million tons with a gross-to-payload weight ratio of 1,000 or more.

The task of an interstellar probe is to get to the target star as rapidly as possible, to look for a gas-giant planet similar to Jupiter during the fly-by, and to return a signal in the direction of the Solar System if its sensors detected the required gas-giant planet.

The presence of a gas-giant planet around the target star is justification for the later dispatch of a manned expedition to that star. As we will see, colonization is not necessarily the only reason for interstellar exploration, just as operations in the Antarctic are not intentionally sent there for the purposes of colonization. A gas-giant planet is an interstellar filling station for refueling starships. Because of advance planning and decision-tree operations, we're trying to establish star flight as something more than the one-way-trip concept, which is its treatment by most SF writers.

With a gross-to-payload ratio of 1,000 or better, a probe could attain a final velocity of about 90 percent the speed of light or Mike 0.9—named after Dr. Albert A. Michelson. It would, of course, go past the target star at this velocity. Its sensors would have to wake up and look very quickly for the visual, electromagnetic, and gravitic signature of a Jupiter-type planet. With several tons of payload available to the instrumentation boys, there are several devices suitable for this sensing work.

If a probe found such a body, it would return a signal. Over interstellar distances, the power required per bit of information becomes rather large. But the probe need only send one bit of data saying "yes." The signal could be sent via a burst of coherent light from a super-laser, and there is *beaucoup* energy available for this. There is considerable kinetic energy in the Mike 0.9 velocity of the probe, plus

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a couple of million pounds of probe mass which, even if converted to energy at an efficiency of one percent, is a lot to work with. Of course, the probe destroys itself, but we couldn't bring it back and put it in the Smithsonian anyway.

The NEO and lunar observatories would be looking for these signals at the predicted times of encounter. They will also be looking for three signals from each target star—one from each of the three probes. Redundancy. Backup. The way three signals come back—or don't come back—from the target provides us with a reasonable picture of what's out there.

If we do not receive any of the three signals, we will be forced to conclude one of two things. Either our interstellar vehicle technology isn't up to it yet because all three vehicles have failed—which means we'd better go back to the drawing board. Or there is no Jupiter-like gas-giant planet around the target star, and the astronomers will have to go back and carefully review their data.

If one of three signals is received, we can conclude that two of the three probes failed en route or that a spurious signal triggered one probe. The "two-no-one-yes" answer category puts that target star in a "hold" file. Later on, we may want to have another look at the observational data that caused us to expend three probes on that target, or we may wish to send starships to take a look if they are in the neighborhood and require an alternate or secondary target star. But we'd remove that target star from our list of planned destinations for a while.

Two signals tell us that one probe failed and that we've got pretty good justification for sending a manned expedition to that target star. But this takes second priority to the three-signal situation which is the highest probability category of all, a sure bet, a prime destination for an interstellar expedition.

Naturally, this doesn't happen overnight. If we sent probes to Alpha Centauri, we wouldn't get our answer for about nine years. For a target 22 light-years out, it will take about a half-century to get our answer. So Project Star Flight isn't a crash program like Apollo. Anyone who gets involved in Phase Two had better be ready to make it his lifework. And, obviously, Project Star Flight is going to be done only by a group of people with a high sense of time-binding, lots of patience, and the native ability to hang in there.

However, while Phase Two is in operation, Project Star Flight Phase Three is in preparation. The manned starships would be under design and construction.

How do you build a starship? Slowly, using every bit of technology on Earth and in space . . . with flexibility in the design be-

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cause of the long time-span involved in construction and the need to keep the technology unfrozen as long as possible. This is a problem we faced even in the relatively short Apollo program. Only 2,978 days were required from the time President Kennedy announced the manned lunar landing goal until Eagle set down at Tranquility Base. Therefore, designs were frozen early, and the Apollo spacecraft is an excellent example of 1961 technology with subsequent improvements in detail design. By 1990, we could have the space-based capability to begin NEO-construction of the starships.

The first starships to go out will be the ones aimed for the nearest target stars; the ones leaving later for more distant targets should be built with more advanced technology and with what was learned from the earlier ships. The starships of Century Twenty-one are going to look and perform quite differently from the early turn-of-the-century primitive models.

But we can begin to lay down on the drawing boards the elements of these "primitive" starships.

Dr. Robert D. Enzmann of Raytheon Corporation has done a considerable amount of conceptual engineering of nuclear-pulse starships. As SF writers and readers have suspected for some time, starships are going to be big. Just how big, few have ever bothered to consider. Enzmann's initial design is probably one of the small, primitive, early-day starships.

Basically, it is a cylinder 300 feet in diameter and 1,000 feet long. A Saturn V without the Apollo LES escape tower would lie sideways across the inside of this cylinder. It contains nearly a half-million cubic feet of living space inside. New York City's Empire State Building would tuck neatly inside of it with just the top tower sticking out one end.

On the front end of this cylinder is a "snow ball" 1,000 feet in diameter made up of 12 million tons of frozen deuterium, the nuclear fuel for the eight Orion nuclear-pulse propulsion modules that will propel the ship up to 30 percent the speed of light (Mike 0.3).

The Enzmann starship isn't exactly just one ship. The cylindrical portion is made up of three identical cylindrical modules docked end to end. Each module is completely self-sufficient with its own auxiliary nuclear power plant, a closed ecological life support system, living quarters, communication equipment, repair shops, storage holds, and EVA landing craft.

Each drum-like module is built upon a central core 50 feet in diameter and 300 feet long. Covering this backbone are eight decks of sub-modules each measuring 10 feet by 10 feet by 23 feet. These sub-modules are used as living quarters, storerooms, laboratories, and recreational areas by the hu-

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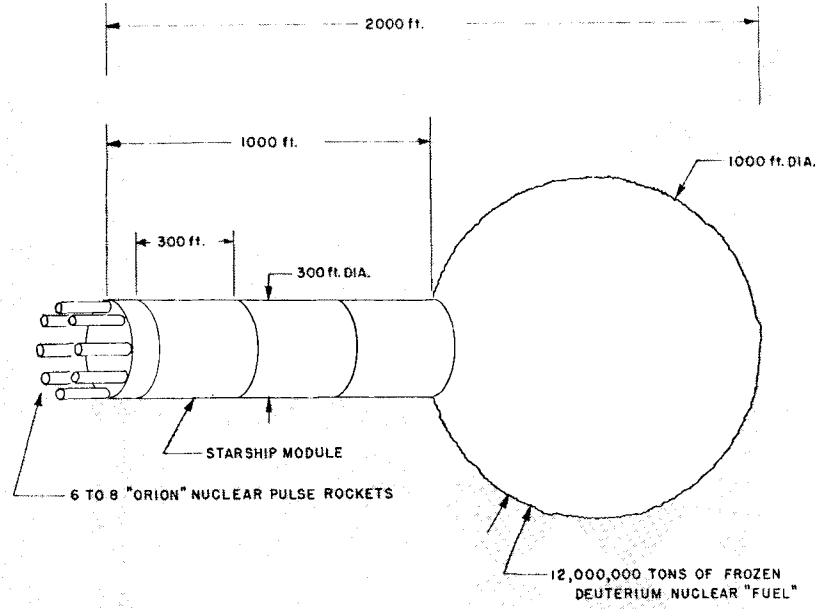

man crew. Each of the drum-like modules has 700 of the smaller sub-modules.

The outer layer of sub-modules is used for communications equipment, EVA landing boat storage, observation equipment, laboratories, heat exchangers, and general storage. Their sheer mass helps provide radiation shielding for the living quarters further inward from the skin.

During acceleration by the nuclear-pulse units, the jolts of the explosions would be smoothed out by the shock-absorbers on each of the eight propulsion units. During the coasting portion of the journey, the ship would be spun-up around its longitudinal axis to provide artificial gravity for the people aboard.

Enzmann designed the starship to begin its voyage with a crew of 200 selected men and women carefully chosen for their skills, knowledge, and social stability. "Within a year," Enzmann goes on to say, "a starship would be smelling of babies." This is the classical SF concept for sub-light-speed star flight, but it is a valid one. It just takes a pretty big ship, that's all.

The optimum starship population is 2,000 souls. This balances the designed closed-cycle ecology of the ship. Structuring the society of an Enzmann starship to maintain this balance as well as to preserve the original purpose of the flight pose some fascinating problems in ap-

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plied social engineering. This is the really unknown variable in Project Star Flight. Perhaps we will have learned enough about it on Earth beforehand; perhaps we will not, and Project Star Flight itself then becomes the laboratory.

But we wouldn't send just one starship to a promising target star. An interstellar expedition should be organized on the "Columbus Plan." That is, it would be made up of a fleet of three to ten starships traveling together. Obviously, this has certain definite advantages. If something happens to one ship, its modules and sub-modules can be disassembled in flight and attached to another ship. All modules and sub-modules would be designed to be as interchangeable as bricks in a chimney. There is strength in numbers and survival in flexibility.

Thus, an interstellar expedition would be very much like a traveling space city with a population of up to 20,000 people.

Truly a gigantic undertaking. But so was Project Apollo. The Columbus expedition was large for its time, too: it took the wealth of a queen to fund it.

In addition to the star fleet, the expedition will be preceded by a string of "metaprobes," which are unmanned precursors traveling ahead of the fleet by varying distances—one light-year, one light-month, one light-day, et cetera. These precursors will conduct an advanced reconnoiter of space ahead of the fleet and will make an advanced survey of the target star. They will be able to report back to the star fleet by telemetry. They would reconfirm the existence of a gas-giant planet around the target star—perhaps.

But their primary task at encounter is to look for a small, rocky, Earth-type planet at least as large as the Moon.

When the star fleet reaches the vicinity of the target star, the first major remote decision of Project Star Flight must be made.

Suppose that all observations in Phase One have somehow been in error. Suppose that the unmanned probes of Phase Two were triggered by something other than the gas-giant planet they were looking for. If there is no gas-giant planet at the target star, there is no way to replenish the deuterium nuclear snowball of each starship and therefore no way to permit the fleet to continue on to an alternate target. The fleet will therefore have to pool the remaining reserves and proceed with as many ships as possible to a predetermined alternate star . . . or back to the Solar System . . . or simply remain in orbit around the target star.

If there is a small, rocky, Earth-type planet capable of being colonized, the expedition would naturally attempt to start a colony.

If there is no gas-giant planet and no rocky planet, the star fleet command selects one of its op-

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tions—leave part of the fleet in orbit and proceed to an alternate, or home with reserves, or just stay in orbit around the star and wait.

Wait for what? A signal will be sent back to the Solar System reporting the findings and informing the folks back home of the next intended move. But even if the fleet must wait in orbit, it isn't in trouble. These are long-life starships, designed to operate for a century or more. Orbiting the target star, they've got the energy of their primary to work with. In the meantime, don't forget that it has taken anywhere from 15 to 100 years for the fleet to reach its destination; in this time interval, technological progress at home and in the fleet itself has not stood still.

(You will note that this is quite optimistic, based on a belief in continued technological progress. I see no long-term historical indications to the contrary, the last few years notwithstanding. The Euro-American culture may have lost belief in itself and in progress, temporarily or permanently, but who is such a cultural egotist as to believe that our culture is the only viable one on this small planet?)

The chances of a star fleet drawing a complete zero on a target star are remote, however, in light of the extensive advanced reconnaissance. But one should always try to consider all of the options, no matter how improbable.

If there is a gas-giant planet as expected, the fleet can refuel, and has several options open to it at this point.

If there is a rocky planet suitable for colonization, the fleet would carefully survey it and plant a proto-colony. It then has the option of sending home two starships with the most important commodity of star flight at this point: information. There is also the option of sending a reduced-size fleet on to a nearby alternate target star. Or the fleet could send assistance to another star fleet that's run into trouble. Don't forget that there will be several star fleets in operation at once after the first one goes, and there will probably be some form of communication between the fleets as well as between the fleet and home. Even though they may be light-years apart, they can still communicate even if they can't converse.

At this point, we've run out of our original planning for Project Star Flight. Once it is accomplished, once there are star fleets in being and at target, the number of options expands beyond the point that we could consider here.

But what is this going to cost? Your gold fillings? Your grandfather's watch? Every penny you can turn into cash?

It is doubtful if Project Star Flight will even put a dent in the economy of whatever group decides to do it.

Dr. Enzmann has estimated

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the total cost of Project Star Flight, from the time of go-ahead for Phase One to the launching of the first fleet of ten starships, at the level of a hundred billion dollars—$100,000,000,000—in 1972 dollars, by the way. This is little more than one-tenth of our current U.S. Gross National Product and about half the size of the U.S. Government's annual budget.

But this cost is spread out over a period of ten to twenty years—perhaps more—and there is some return on investment during the early phases. These interstellar probes and manned starships aren't going to deplete the Earth's natural resources because it will be too bloody expensive to haul that much raw material up out of the Earth's gravity well. The ships will be built from space-obtained resources and with Sun-originated energy. This means that whole new industries will be created in space. In fact, it may mean that all heavy industry will be moved off Earth into space, permitting us to de-pollute the Earth. The synergisms of Project Star Flight are interesting in and of themselves.

Dr. Enzmann further estimates that the cost of a starship will drop to about one billion dollars after ten of them have been built and the engineers have ironed out the engineering wrinkles, eliminated the bugs, and solved some of the knotty technical problems that always plague a new endeavor. One billion dollars isn't a lot of money . . . about five times the cost of an Apollo manned lunar landing mission.

Who will be able to afford a starship at these ridiculously low costs? Perhaps any group of people who don't like it here and want to go somewhere else.

So, my friends, the rest is up to you. This has been a speculative technical article with direct and straightforward extrapolation of nuts and bolts. We have applied modern program management techniques to the seemingly-impossible achievement of star flight . . . and discovered that it can be done within the bounds of reason, technically and economically.

Many SF stories have been written against portions of this project background, and there are many more yet to be written . . . and read . . . and enjoyed. As we've seen here, interstellar expeditions at sub-light-speeds need not be expensive. They need not be one-way trips. They need not have the original objective of colonization any more than expeditions to Mount Everest or the initial trips to the Moon did. For expeditions out to about eight light-years, the original crew has a very good chance of returning; with advances in geriatrics and longevity research, we may have a synergistic relationship here that would make star flight out to quite respectable distances something that could be accomplished

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within a single lifetime. Naturally, some people aren't ever going to come back to Earth again, but things like that seldom stop motivated people. My own ancestors never saw their native Germany again after making a short, 3,000-mile sea voyage a couple of hundred years ago; but I've been back several times. In fact, our intrepid interstellar explorers stand a much better chance of getting there and getting back than many terrestrial explorers up to and including Twentieth Century men.

Yes, there are deep philosophical and ethical problems posed by star flight; there are sociological considerations to be discussed; there are options—religious, ideological, and economic—to be investigated. And this is where the fun begins. And it is a story that won't be taken away from us—as lunar flight has been—for at least a generation or so!

With respect to star flight, I submit that we stand at the same point that space flight did in 1930. The initial crude experiments have been performed. There is a small group of people who know it can be done. There is a growing amount of serious speculation. And we are about 40 years from seeing it come true.

So you can no longer dismiss star flight as being impossible, impractical, or even improbable. Not when august scientific bodies such as the New York Academy of Sciences have already held symposia about it. And certainly not when somebody, not necessarily us, stands a good chance of accomplishing it in the next century. ■

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WILLIAM E. COCHRANE

Courage has been defined as grace under pressure.
When the pressure comes from the largest beast in the world . . .

Whalekiller Grey

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"The truth? About whales, lad? Ah, now, you must remember; a whaling story be never true. If you'd tell it exactly-as-it-was, why then whalekillers and aficionados *alike will know you for an ill outsider, and a lubberly one, at that. What's more, lad, they would not find it to believe your story, see you. For there's no man, who follows the great whales, has he ever told the whole truth about anything—not your blessed Herman Melville, nor my fore-oar boy on last year's cruise. Ya see, lad, there be only one truth; the great whale and the man who do kill him. One truth, I say, not two things.*

"As for this here tale I tell, it is as true as most. . . ."

—Unknown foc'sle hand
Off South Georgia Island,
CE 2244

Master Whalekiller Robert Grey sat in the third prayer position on the whalebone stool and prepared to kill himself. It was the afternoon of the seventh day and outside twenty men and a prime sperm whale waited to help him do it. He had this brief hour to himself, in seclusion by custom, then he would get up and meet a destiny he had begun twelve years ago in the Azores.

I owe a life to the sea, to the cold South Atlantic, and now the time seems right. . . . The thought interrupted the prayer phrases in his mind. Robert Grey was well along on the mental path he needed to take in order to will his own death. *Jeninne is dead! Oh, Jeninne!* His thought cried his pain and the face of his love, her black hair and shining eyes, dimmed the altar, shimmering it before his eyes. His breath plumed out in a smoky cloud of condensed moisture, fogged the silvered surface of the symbolic lance he held before his lips, calling his mind back to the ritual.

The ship's cabin, his private quarters and shrine, had been chilled during the last hour until it was near the ambient temperature of the South Atlantic, rolling and tossing outside. Grey barely heard the motion of the ship, or the noises in the passageway, his whole concentration was on the cardiovascular exercises designed to warm his body—the movements of the ritual prayers. In a few moments he would be outside and, within the hour, swimming in the South Atlantic. He was wearing the inner liner of a double wet-suit, but he needed all the body heat he could generate—hence the exercises; or at least, a practical reason for the ritual. Robert Grey did not own a bone-bred allegiance to the whale-lore religion, but he was mystic enough, had followed the killing-boats long enough, to believe where he could not recognize logic.

He moved through the ritual, shifting the silvered killing-lance to his left hand, and reciting the short, chopping rhythm of the chant in a

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low tone, breathing the words, with little vocalization.

The door behind him opened noisily, there was a sea-wind whining through the deck structure of the ship. He turned slowly, the warming peace of the ritual was too much with him for the noises to startle.

"Pardon, *Majestad.*" Konrad, his boatmaster and dresser, was upset. At disturbing the ritual? No, something more. . . .

"The arena president to see you," Konrad explained.

"Here? At this time?" By custom and tradition of cetomacy, Grey and his *quintada*—his boat crew—were always alone on the whale-catcher ship at this time. Grey's privacy was nearly sacred.

Then his mind opened and the memories he'd been rigidly denying himself came flooding in. Jeninne . . . his wife . . . the crude, brutal kidnap message he'd received just as the whaling fleet sailed from Grytvken Harbor . . . Jeninne, his warm, beautiful Jeninne, was dead. There could be no other reason for the president coming to him—for breaking his prayer ritual.

Grey shifted the killing-lance gently and reached to lay it on the altar table. He had been attuning himself to the death ritual out in the arena, his stoic appearance was set by the prayers, and covered the intense agony of loss he was feeling. He turned completely on the stool, still seated, to face the door. His hand, when it left the lance, was steady; his body obeyed smoothly; still, he couldn't trust himself to stand. The heavily ornamented weather cape hid the slump of his shoulders, and he pulled it across his chest, against a cold that welled out from his spine.

"He came down in a biggish copter," Konrad was saying. "Landed full on our aft deck. See him, *Majestad!*"

Grey nodded. "Aye, let him in," he said, and his voice obeyed him briefly; none of his fear showed.

Herald MacNeal, the arena president, was a large, bulky Scot. His face was red from the cold, his eyes a shiny blue and his teeth a brilliant white in a wide grin. He wore an orange flight-coverall and overjacket—Antarctic survival colors that glared brightly against the sea-blue and grey of the chapel color scheme. President MacNeal filled the room with a bright-noon sunlight.

"*Ishmael, Majestad,*" he greeted Grey.

"Have ye news of my wife?" Grey ignored the greeting. The man was a British official, technically a magistrate administering Twenty-first Century British whaling law as it applied to cetomacy and the Ceremony in the arena, but he wasn't a whaler. Actually, he managed the Cetus Ceremonies and was in near-despotic control of nearly two hundred miles of sea,

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with all the souls and machines in it—the whalecatcher fleet, the TV and news planes; men, women and penguins—everything. But his pretense to whalelore didn't even have an *aficionado's* sincerity. Grey didn't like him.

"No. Nothing." The man's face went sad, like a great dog, even that appearing false in its quickness. "The Interpol net of four countries is tied into my comm-center on the factory ship. I'll hear." He dismissed Grey's problem and went on to one of his own. The change of thought played across his face.

Grey's irritation began to rise through the calming that the ritual had laid on him.

"Grey, lad," MacNeal said, his Scots burbling into his voice, "I've got just a moment to check with you. You're all right, heh?"

"Yes." Grey succeeded in controlling his voice, but it thickened into whaleboat dialect. "I dan'not like visitors aboard the *Skua Harvest* afore a Cetus. But, I'm a'right."

"I'm no visitor, mon! We have a Ceremony to start and I have to check every little detail. Millions of people will be watching. Do ye know, we will be beaming off the new South Atlantic satellite? The Russians have orbited communications satellites in a Sky Net spread across sixty degrees south latitude. Just for the arena. Your Single Cetus will be the first to use them. A great honor, heh? You'll have to give them a Master's performance this time, Grey. Do ye know, I've got more TV aircraft in the press cordon than ever before? Even more than for Buelega's Cetus back in '32. You remember, that's the one where he was . . ."

". . . Killed? Yes," said Grey. "I was rowing harpoon-oar in the Greenland arena that year. When Buelega's whale took him, I paid in my own *quintada* and we have rowed to the whales for twelve years. In six, I was better than Buelega."

"But what about now, lad?"

"Now?"

"Aye. We all know your wife may be dead by now."

"I have thought on that possibility," Grey said bleakly.

"So have I, lad. So have I. Do ye know, I can't stop the Ceremony. The TV contract; the national funds spent in preparation; the *aficionados*—I can't stop it. You will have to fight. But I am prepared to be lenient, if we can find a way. I can allow you extra harpoons, from your *quintada* boats, more boat-lances than you usually use. A formula could be worked out."

"Are ya making the offer that I bribe you, MacNeal?" Grey snarled, his voice thick with anger.

"What? No, damn it! You know me better than that, Grey."

"Then don't bribe me. Ya don't know me, at all."

"But, you can't just go out there

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and let the whale kill you! Grey, if that happens—I'm warning you, if you do that, every *aficionado* in the world will know you made a deal with the gambling syndicate over your wife's kidnaping. Huh, 'better than Buelega', say you. That doesn't matter one bit and you know it. A single mistake, mon, and the *aficionados* will drop you so fast you'll sink. One sniff of a smelly fight, 'special from you, who's been so snobby an' pure about the art, like you have—why they'd scratch your name off all the trophies ye ever rowed for, lad. Do ye know, I, myself, would see to ruining your reputation."

"Threats, MacNeal? Threats. So, at the end, mon, you are no better than them that took away my Jeninne, are you? Threats, to me. *Do ye know,* MacNeal, what I face, out there in the sea?"

"Aye, forebye. A male sperm whale. A great beauty. Do ye know, I, myself, followed him down the whole coast of Africa with the selection boat. I measured him, myself. So, I know he's good. Seventy-five feet long; weight estimate eighty tons—he is the biggest ever, Grey! You must make a good fight!"

"A whale? Ah, no, it's the King-a-Death, do ye see." Grey's voice ran down as he talked until he was barely whispering. "The biggest, strangest death ye can know. A ship's bow out o' the sea; a mountain avalanche falling onto a's face; any dream ye've dreamed like falling from a great height onto a grey rock—a bigger, harder, heavier death than any you've known, MacNeal." His voice was just audible at the end.

"Stop this talk, Grey. You're not to get killed, do ye know? I've told you what I expect. Now you must do it!"

"Have ya tol' the whale?" Grey laughed, two painful barks. Then, with an eye-tricking twist of movement, he reached behind him for the silver lance-point, held it point-wavering toward MacNeal.

"Get out!" Grey was suddenly sick of the Scot's red face and overwhite teeth.

"Grey, I'm warning you! I am the law at this arena!"

"Get out! You can't warn me, whale-gut, and you can't law me. Whatever I find to do—out there in the sea, live or die—you have naught to do with it, scum. Not you—not *them,* the gamblers--not . . . not even Jeninne, dear heart. There be only the whale . . . and me. We decide who lives and dies."

"Very noble! But you're not on TV. I want a straight, classic fight from you, Grey, do ye know. No extra-daring tricks, no *brio* lances to get you killed on purpose, just classic cetomacy or I will beach your whole *quintada*—for life. Understand me?"

"An' you? You, an arena president for five years, and *you don't understand.* You really don't, do

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you? GET OUT!" Grey raised the ceremonial lance to throwing position; its head quivered with his rage.

The president, unable to meet the violence in Grey's eyes, backed out the door. Konrad, silent through the whole exchange, held the door, waiting for orders, or the dart of the lance; even he wasn't sure which.

Grey's breath sighed out, a flat cloud of vapor in the cold room—a whale-spout as he broached from the depths of his anger and fought his pulse back to normal.

"Stand ready by the men, ol' friend," he said finally. "I'm for this whale. *Cetus est.* Ahhh! How is the time?"

"Twenty minutes, *Majestad,*" Konrad's voice was soft. *"Ishmael!"*

Grey nodded and turned back to the altar, his hands returning the prayer-lance to the peace-and-rest position in his lap as he sought the white, ivory image of the swimming whale on the altar. Peace-and-rest; he must calm his mind and body for the Ceremony to come.

A sperm whale, a male—the very best whale there was—and, oh, the way he had to fight it! Pressure to let the whale win—death or maiming for himself—from the vast gambling interests. *Oh, Jeninne. Are you still alive, love?* His own president ordering him to win—ah, what a doubt that showed, when the whole art of cetomacy was designed to let the whalekiller win. Pressure from half a world of *aficionados,* watching eagerly for the slightest mistake, sure that they would see his death today; waiting for it. Classic cetomacy, MacNeal had said. The *aficionados* would count it a depressing failure if he fought a standard Ceremony. They expected—demanded—more from Robert Grey.

He had been prepared to die, without thought, simply an easier path to follow than others he could see. Now, that was denied him, or seemed to be. MacNeal was a stuffy fool, but he could make good his threat—the *quintada* would suffer. Grey must kill his whale, he could not lose. His mind whirled between the two choices. Oh God, what a frame of mind to be in, now, before the Ceremony. He had to have flexibility. Cetomacy was a formal art, but it had to have room for mistakes. And Grey had been left no room.

His eyes rested on the ivory image—the whale. Who had told the whale: *Lose, whale! The President wants it.* Would the whale hear Grey crying: *Win, whale! Jeninne, my Jeninne wants it.* Grey bowed his head, forced his tumbling mind to recite the whispered prayers, moved the lance through the symbolic motions. He let the prayers take hold of him, bring forgetting. He had only twenty minutes; it wasn't enough time, but the whale

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was waiting to kill him. Hopelessly, Grey could only meet it.

Grey came out of the cabin, braced himself against the wind's whip and turned his head to review the two ranks of his boatmen drawn up abeam of the mid-deck. His weathercape and spread-leg stance made Grey look short and square. He was not tall and his heavy-muscled harpooneer's legs gave him a crouched appearance when he stood. His early years at a boat oar had thickened and muscled his arms, shoulders and back; squared and seamed his face to match the bulky lines of his body. Grey, knowing his bulk was unusual for a whalekiller, rarely stood in public appearances.

He moved now, aft along the deck, and the cape-shrouded body moved like a great cat, perfectly balanced, smoothly flowing from step to step. He went to the rail to look at the boats of his *quintada,* bobbing in the water off the port boom. The boats were Konrad's job and never in the twelve years they had been together had there been a mistake in the boats. But checking them was Grey's privilege and he did it before each killing. This time he stared down at the thin, wooden hulls dancing and bobbing in the choppy swell and forced his mind to look at details of rope tubs, oars, and harpoon shafts. He was driving Jeninne's grey eyes, soft lips and warm body back—back—into the forgetting part of his mind. The prayer ritual had helped.

The prayers had set his mind. But, then, the president's doubt of him, compounded by his own guilt—he *had* been intending suicide—had boiled to anger in him. Anger, and a driving will to live, to prove the Scots fool wrong, that was as dangerous as the death wish had been. In the end, he'd had to change the whole content of his emotions; force out the death drive he'd been building, then strive just as hard to repress a rebirth to life again.

He raised his eyes to look at the sea—a short, wicked swell with a wind-driven chop flickering white, monks' heads on every wave. The wind was not bad. These seas drew winds gusting up to one hundred miles an hour, in screaming williwaws. This was a good day, windy, but good.

A ghost-grey fan of whale's spout caught his eye across the arena. The forward tilting spout of the sperm whale, as distinctive to Grey's eye as a fingerprint, burst in the air, then was torn to a flag by the wind.

Higher up in the sky, circling the arena outside and above the closed airspace over the sea, were the formations of TV planes. MacNeal had been right, there were more than Grey had ever seen. They flew north to south, counterclockwise around the perimeter of the

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arena with cameras and TV lenses focused on every detail of the Ceremony. Grey knew that zoom lenses were now carrying his face, in full close-up, to the watching *aficionados* of every nation on the Earth that could boast a receiver. The swirling aircraft swarmed like carrion gulls—and for much the same reason . . .

The whale's spout shot a fan of movement out of the sea, calling Grey back to the surface of the arena. Out there was the whale—waiting for him.

He murmured the final stanza of the shrine prayer, striving for calmness. A whalekiller cannot enter the arena with too great a desire for life burning in him—or too much of the world around him. His anger must be purged, lest it lead to deadly mistakes—even fear. Jeninne must be thrust away, for a time. The world of TV planes and *aficionados,* forgotten, put out of mind. His world was to be down there in those boats, driven by those oars, out on that sea; rowing against . . . *the whale.*

He stepped back, away from the rail, turned to the waiting ranks of boatmen. Their faces were stiffly formal, but they were all looking at him, searching his face for a sign of weakness. The president, worry-sick MacNeal, had driven a wedge into his crew that had never been there before. Twelve years of success was wiped away. He was a tyro again. They would take the boats out with him, but he could expect no brilliance, no help from them, until he showed his *brio* first—showed them the direction he was going to take with the sperm whale.

Grey was alone, again. Jeninne flickered and receded.

He returned their grim stares with a mocking grin, pure *brio,* and folded his arms elaborately. A signal gesture that could be seen by all the watching *aficionados,* and a signal to Muldoon in the look-out high up on *Skua*'s masthead.

"Blows! Blows! Thar-a-point. She blo-o-ows!" he cried down the beginning call of the whale hunt.

"Man the boats! Boats away!" Captain Olsen, *Skua Harvest*'s skipper, added his ancient call to an ancient business and the Cetus Ceremony began. It could not be stopped. It would run inevitably to its conclusion, through movements as formal as a figured dance, never changing, as it had for over two hundred years of arena ceremony—a stylized expression of whalehunts that derived from two thousand years of man's past experience in chasing and killing the giant sea mammals.

Robert Grey paced slowly to his boat, climbed down the net and dropped easily into the pitching hull—timed by a sharp bark of noise from Konrad. He was the last of the *quintada* to enter the boats and he sat, cape-wrapped, in the

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stern as the boats pulled away to form the line of parade and move into the arena.

The South Atlantic arena was a one-mile circle of ocean, forty-five degrees south latitude, zero degrees longitude. A bowl of sea curtained off by a sonic net to contain the Ceremony's whale—a giant sperm, the lonely giant of the South Polar seas. This one, a prime male, had been hand-picked for Grey's Single Cetus off the coast of Africa and herded to the sea off South Georgia Island, then led into the arena. Here it waited, circling the sonic fence endlessly, waiting for its appointed meeting with Robert Grey.

In a line-abreast formation, the five boats rowed into the arena and slowly out toward its center. They rowed with a measured beat—six men at the sweeps, a harpooneer and a boatmaster steering for each boat. The number-one boat carried Master Whalekiller Robert Grey as well, sitting on the cuddy-board beside his boatmaster, Konrad.

Grey felt the tingle of the sonic fence as the boat crossed the barrier line and entered the arena. From all around, drowning out the wind and creak of oars, floating speakers blared out the opening trumpet bars of the *Melville Overture*. The oarsmen took up the pulling rhythm of the clashing chords and the boats paraded slowly into the center of the unmarked circle.

The music died. The boats drifted to a halt; oars lifted clear of the water. Only the wind sighed across the waves, even that seeming calm by comparison with the music.

The harpooneer in Grey's boat sat intently erect, his feet and hands braced against the thin wooden hull. Across the water, in the number-three boat—on Grey's left—the Basque harpooneer bent over dog-fashion, feeling the boat hull with bared hands and feet, oblivious to the cold and wet. All waited. The boats tossed up and down in the short chop, the thin sun flashing on Grey's decorated cape.

The sea was good—and bad—good in that the steep, vertical waves, the wind-driven whitecaps, hid the outline of the boats from the whale; bad, in that a smoother, flat sea would transmit the underwater motion of the whale to the boat hulls evenly and quickly. Grey had felt it himself on such occasions. And it was these underwater motions the harpooneers were waiting for, feeling for with their every sense. The sea was good and bad.

Below the surface, below the testing harpooneers, swimming deep, was the sounding grey sperm whale—the prime antagonist in the Ceremony. The tossing boats were waiting for his rise.

Grey watched the number-three boat. In this sea, the Basque would be the first. He was uncanny in his

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sensing of a whale's movement. On a calm sea, they were all good—in this chop . . .

The Basque cried out; singing out the syllables. Grey translated his language by recognition: "She rises!" He looked to his own harpooneer. The man frowned and shook his head.

"Bro-oach-eess!" the Basque sang out, dragging out the single English word he ever used. He was pointing forward and to port.

The great, square head broke water and surged up—up—until the domed dorsal hump was clear of the water. The long, pencil-shaped lower jaw gaped open, its teeth ranked in picket-fence deadliness, and snapped shut. Grey thought the sperm was going to lay over on its back, so high did it jump on this first broach. But it didn't. It dropped back into the sea with a white-water surge that reached half-way to the boats and began swimming away from them. Its spout sighed up into the air, audible over the wind, a visible flag to the boats and to the millions of TV-watching *aficionados.*

"Cetus est! First spout!" The phrase rang a silent cry in Grey's thoughts. The roaring plume of breath was the whale's challenge to the killing-boats and the combat was begun.

Grey pumped his hand over his head five times and knifed it forward. He was sending in Paget's number-five boat first. They would move in close, plant the first harpoon and ride out the whale's first sounding. Then the number-two boat would hook up and the two boats would drag the whale and try to plant more harpoons, tire it into swimming instead of sounding. They would give Grey a chance to see how the whale swam and discover its fighting spirit and style.

For a moment Grey watched the boat move in, its oars stroking in quick time, then he saw that Paget was pulling in on the correct line—*over the flukes*—and the whale was swimming straight out away from the boat. This *was* a good whale—no frightened soundings or deadly attacks on the boats—a good whale.

"I'll get dressed now," Grey said.

Konrad nodded and motioned to the after-oarsman. The oarsman peaked his port oar, sliding it inboard and putting the handle into a socket just below the starboard gunwhale. The oar was held, blade clear of the water, ready for instant use, but not cluttering the inside of the boat.

Konrad moved down to the thwart and opened the two polished kit boxes. His movements were semi-stylized. Each piece of the suiting and equipment had to be put on in a prescribed order and in a certain manner. Neither he nor Grey spoke to each other. Grey moved his body as required from long years of habit, keeping his balance on the pitching, bob-

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bing boat as he dressed. He remained seated throughout the operation, his eyes distantly watching the whale move around the ring of the sonic fence. The oarsmen were turning the boat slowly so it was always pointed at the swimming whale. This also was part of the dressing ritual.

The wet-suit trousers were first, smoothed over his legs and fitted snugly at the feet. A canvas belt sealed the top of the trousers. Konrad cinched it and tucked in the ends, passing his fingers firmly over the prayer phrases sewn along the belt in raised thread. Next he presented the shirt for Grey's arms, sliding it quickly over his head, so that Grey's study of the whale would not be disturbed. The shirt was heavily ornamented with the painted design of Grey's fighting arms and he was, for the moment, conscious of the eyes of all the watching *aficionados.* The TV cameras in the circling cordon of aircraft would be focusing zoom lenses on him now in tight close-ups, so that each move of this ritual would be visible. He felt the weight of the watching crowds pressing in on him, but it was a familiar feeling and he shrugged it off.

The crowd, the cameras, were there, but the conflict, Grey's fight to the death, was with the whale down here in the sea.

Konrad drew out the flat air tanks, showed the gauges to indicate their fullness and lifted them over Grey's head to lay them against his back. The harness was pulled snug and the hose and mouthpiece positioned against his left cheek. Next the hood was pulled into place and the face-mask adjusted, then pushed up to leave Grey's face clear. A waist belt with the jato propulsion squares completed the ritual, except for the swim-fins on his feet. They would go on after he placed the first killing-lance—the one he was permitted from the boat.

As Konrad sat back, Grey took the mouthpiece in one hand, put it in his mouth, under his lips, between his teeth with a practiced twist and checked the demand valve. This was the one part of the dressing ritual he did for himself.

President MacNeal turned his head at the cold airblast from the open bridge door. The radio comm-tech ducked in and stood blindly, his glasses fogging in the warm air of the factory-ship's bridge. He reasoned his problem out with visible facial contortions, took off his glasses and found MacNeal. He had a message form.

"Sir," he said. "A Coded-Personal to you. Relayed to us from the U.S. Naval Base at Suleberger Bay. Our incoming reception's all hash because of them up there." He waved his hand upward, meaning the circling aircraft.

MacNeal took the sheet, read,

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and said: "Ah, God!" His voice was loud, the phrase startled out of him by the words on the paper. "Robert Grey's wife is safe. She was rescued in Melbourne. The Navy is flying her down by long-range jet," he explained into the silence he had created on the bridge. Then he picked up his binoculars, looked out at the maneuvering killer-boats. "He's going in to the whale," he said. "He doesn't know, and he's going in. And I can't tell him." His voice was anguished on this last. Herald MacNeal was not as insensitive as his public persona forced him to be. "Oh, God!"

He turned back to the commtech and growled out an order—one of the instant decisions he could make when he was dealing with things in his field of control. "Take this message to the two pilots on the medical copters, now! By hand! They are to tell him verbally, if they go out. Only verbally; not by radio. If the press gets this, before I release it, I'll have them on the flensing deck, tried down for candle-fat. You, too! And that goes for all o' ye here!" He raised his head to the bridge crew. "Grey has a right to hear first before the damn newsies, do ye know."

A muttered, "Aye," agreed with him.

"Jump!" He sent the comm-tech out on the run. Then he went back to watching Grey with the whale, trying to keep his thoughts off the horror of the circumstances which might send out the medical helicopters. A precious message, that might be delivered only if Grey missed his kill—if Grey was . . .

Konrad replaced the oarsman on top of the cuddy-board and together they unshipped the rudder and put out the twenty-two-foot steering oar. From now on the accuracy of Konrad's steering, in close to the whale, could not be left to the clumsy rudder. He needed the leverage and control of the long oar. The rudder was triced against the port side of the hull and the oarsman reset his oar, picking up the pulling rhythm with an easy grace.

"Ready, *Majestad,*" Konrad reported, his eyes also on the whale, now.

Grey rose and went forward to the harpooneer's position in the bow. It was customary here for the boat crew to speak to him for luck, and their low, *"Suerte, Ishmael, Gott mitt, Cetus est,"* phrases washed around him as he crossed their thwart stations. The harpooneer said nothing—they were equals, although the whale was Grey's to kill.

Grey spread his feet against the boat's hull, leaned his left leg against the notch in the clumsy-cleat and stood erect. His left hand rested on the lubber-pole for balance. The harpooneer would take the pole down when they came on the whale. To his right across the

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thwarts, pointing at the bow was the first killing-lance—a steel-black boat-lance, eleven feet long, with a six-foot tip, ground razor sharp at its leaf-shaped end.

Grey felt the beat pick up speed as Konrad signaled the oar tempo up and steered for the swimming whale.

The whale, a scarred, grey-blue sperm, was swimming strongly in the circle defined by the sonic ring. It had been harpooned twice, but the panic of the shocks had left it. Now, the sperm swam against the continuing pain of the toggled barbs in its side. It swam straight away, not curving from side to side as some whales did. It towed the two boats behind, pulling them easily still, but they had tired it.

Paget's boat, the first to fasten, was riding on a long line. Cooper's number-two boat had shortened line and was riding in close to the whale, the thirty-eight-foot boat dwarfed three times over by the plunging back and high, square head of the swimming animal. Both boatmasters were playing the harpoon lines around the loggerhead in the stern of their boats to keep a good distance from each other and they were steering on the inside of the whale's circling path, the drag of their boats helping to force it into turning properly around the arena. The boats were sliding through the sea, their oars peaked out of the water, like skimming spiders.

But now Grey was watching the whale, timing its fluking, noticing how far under the massive forehead dipped, how high the hump rose as it swam. These details were vital to him. They set a rhythm he must match when the boat drove him in close.

Earlier, when he had assumed his wife dead, lost to him, Grey had decided to ignore the whale; to let the first lance be clumsy; to meet the whale as a welcome bringer of death. The attitude had been easy to assume, frighteningly easy. He had merely let go; given up his life, back there on the *Skua.* He could trust the whale to do the rest for him.

Thinking about it, even now, brought back a hesitation; a pause. Grey's desire to live was a flame in him now, and twice as dangerous as the death wish had been. Now, he had to read the whale sign exactly. The whale was an enemy and could kill him quickly, effortlessly, if he made a mistake. The whale didn't know about Robert Grey's change of mind—his renewed will from dying to life.

So, whale, Grey thought as he absorbed the movements of the great beast. *I ha' to watch you most well this time, whale. You're not like the others, I can see. Ah, ye dip your head, so! Well, this is a sea for it, but you will lose, ma whale. I must be sure an' kill you. Aye, no doubt. And I don't, you'll kill me—surely.* Grey very rarely talked in

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the boat. It was part of his reputation—his *brio*. But he always talked to the whales—silently, inside his head. Sometimes, in the speed of action, during a Cetus, he would not remember talking; but afterward he knew he had done so. In part that was why he was always silent in the boat. He feared that he would one day speak out loud from the boat and men would know something about him that Grey did not want known.

Konrad was closing on the whale. He was steering head on, *cabeza-a-cabeza*. The sperm whale had a blind spot. Its eyes were good for seeing to the side, and a little forward. It couldn't see behind—the harpoons were set over-the-flukes by rowing up from behind—and it was blind directly in front. Head-to-head, a boat could approach, move in fast and set a killing-lance before the whale sounded, when it saw the boat at last. This was the way Master Robert Grey made all of his kills—a *brio* signature.

Grey bent to pick up the lance, moving it forward to get the balance and holding it in a two-handed grip. The harpooneer pulled away the lubber-pole. Grey held his balance with a leg against the clumsy-cleat. He kept his eye on the closing sperm, sighting its hump just to the right of the spout. Konrad was on the correct line. Now, the square forehead was visible under the bow-swell the whale was shoving over its back. There it broke water, scarred and discolored from unknown battles in its own deep hunting-seas. Then, down again and still closer—less than five fathoms.

"'Stribor!" Konrad called, and the boat swung wide to starboard, away from the whale, all oars peaked out of the water.

The sperm's great forehead rose out of the water, cleared the port oars by a foot only. The small, staring eye with its own curling wash of wave, was even with Grey.

"Habor!" Konrad leaned his weight against the steering oar. All of the pulling oars dropped and dug, shoving the boat back in, directly at the head. The bow touched, then the wave-wash of the moving whale shoved it back.

In that moment, Grey, bending out over the body of the sperm, stabbed down deep with his lance.

He had raised it high above his head, then thrust out and down, jacknifing his body below the gunwhale as he drove the lance through skin and blubber. His thrust and the whale's motion toward him drove the lance a full five feet into the whale, just behind its head—deep in the body . . .

But the lance didn't go deep! It struck something—a bone, perhaps the skull—and stopped. Grey swung off balance, caught at the bow cleat with one hand. The lance bent, then sank into the whale again.

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The lance tore from Grey's hand. He let it go. Left it in the whale to work, and cut and kill if it would. It was a bad lance.

Despite his control, his will to live, Grey had almost killed himself. He could have fallen out of the boat . . . the whale, hurt, could turn on his boat; might still. No, it was sounding. Diving to escape the boats that tormented it.

The oarsmen backed the boat, riding the whale's wash away, to clear the upflung tail. The whale sounded and the following boats towed along behind.

Grey saw the harpoon line on the number-two boat kick and snap as it burned out between the bow chocks. Cooper was giving the sounding whale line, letting him dive. At fifty fathoms an underwater sonic floor closed the arena—the sperm would rise soon.

Grey made his way back to the aft cuddy-board. He came back in silence, the oarsmen avoiding him. He had failed on the first lance. They knew it and they thought they knew why. Grey wanted to shout at them, yell out: *"It was a mistake! I make mistakes!"* But he couldn't. MacNeal, with his worrying tongue . . . no one had left him any room to make mistakes. They were all waiting for him to die—expecting it—prejudging him. They had forgotten twelve years of whalekilling skill—*brio* of the first class—forgotten every whale they had fought together . . .and all over one bent lance.

Grey wrapped himself in the silence and sat heavily on the cuddy-board.

Konrad was letting the boat ride idly clear. The other rushing boats were already a quarter of a mile away. When the whale broached, spouting and still swimming away from the boats, Grey raised his hand, pumped it three times, signaling the number-three boat in. The whale had two harpoons and the lance in its port side. It would turn that way to ease the pain—too quickly perhaps. Lucas would plant his harpoon on the starboard side. The drag of his boat would keep the whale swimming on the proper line. Grey sat, and let the afteroarsman fit his flippers. He was glad to sit and there was no pressing reason to stand. The TV cameras would be watching the harpooning, and he no longer cared if they caught him sitting down. If anybody saw, it would look like part of a dressing ritual.

"Fast boat," Konrad said. He was standing high, watching the harpooning. Lucas' boat had set its harpoon in the whale and was being towed. Konrad steered the boat back toward the line the whale would follow, coming to them. This sperm was swimming a nearly perfect Ceremony. Except for the one lance it was a perfect Cetus. The whale had made three circuits of the arena now, keeping

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an exact distance—about fifty fathoms—from the sonic fence. There had been no turning, twisting, charging at the boats—things that made a bad fight. This was a good whale.

But Grey could see that it was swimming slower. Soon it might stop. Then the boats would have to go in and use lances to prod it into motion. This was dangerous for the boats and it would spoil the unity of motion of the Ceremony. It would waste a good whale.

Grey stood up and stepped backward, heel first in his flippers, up onto the cuddy-board beside Konrad. It was time to begin his part; his solo Cetus with the whale.

"Another boat-lance, *Majestad*?" Konrad asked. The question showed Konrad's opinion of the first lance. Grey was entitled to set two boat-lances, but he never had. His *brio* had kept him from it, even with difficult whales, and this was an easy whale. Konrad was suggesting that he start over again, from the beginning.

Grey shook his head, pointed his finger to the lance rack and beckoned. The gesture was for the *aficionados*. His oarsmen knew what was needed and were already passing him the second lance. Grey took it and stood it on the deck, tip high over his head. He stood straight with a hand on Konrad's shoulder for balance and looked out toward the whale.

One mistake. The next mistake might give the whale its chance to kill him. He didn't think about fear, because fear happened to him very quickly when he went into a whale; very quickly, then it passed. He was used to this reaction of his body and worked with it. He didn't fear the thought of making a mistake, either, but if it happened, Grey decided that he would let it happen under the water, where he could not be seen so readily. He was going into the sea for his second lance.

Konrad started the boat toward the whale.

At one hundred fathoms, when he was certain of the whale's line, Grey slapped his hand down on Konrad's shoulder; slapped it once as a command—and a parting.

Konrad turned his head, his teeth shining in his twisted-pirate grin. *"Ishmael!"* he yelled. His boat-voice, loud enough to carry to the whale, was meant to shock courage into Grey—his method of sharing emotions.

Grey stepped backward off the boat, carrying the lance with him, and entered the sea with a blue-white flash of shock as the cold struck at him.

He had fitted his mouthpiece and brought down the face-mask in a quick economy of motion, before he'd stepped off. His body was protected and the double wet-suit would soon warm him. The cold was only relative and he ignored it.

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He bobbed to the surface, found the boat—Konrad had peaked oars, then backed down so that he was now behind Grey pointing the line to the whale—and began swimming strongly to meet the whale. He carried the lance in his right arm, the off-whale side, and swam using a flipper kick. The jato belt would be used later, to give him swimming speed to match the whale.

From his height in the waves he could no longer see the whale, but he could hear it. With his head under the water, the bleating squeals of the sperm were clear and loud. The cries were echo sounding against the arena fence, but there was pain, too. No fear. The whale swam away from the harpoon-pain, not in fear of the boats.

Ye're not afraid, are ye, King-a-Death? Grey was thinking. *You did that wi' our first dart, did you not? Now you swim so to meet me, but not as you're afraid, whale. Nay, that's not a mistake I'll make.*

Grey submerged, swimming down to his negative buoyancy level a few feet under the surface. There, the sea-change caught him as it did during every Cetus. The brief thrill of fear flooded him and the water lifted away his weight; freed his muscles from gravity. His heart pounded, forcing his blood to flow against the cold; his muscles, swimming without effort in the sea, brought a clear bright quality to his nerves and his thoughts. The depression, the sense of failure at the first lance, was gone. It had disappeared with the rest of the world on the surface above. Down here the pressures were gone. The TV cameras might see his decorated suit down under the waves; they couldn't see his face. The president couldn't see him at all and no power could touch him, down here in the sea. Even the boats of his own *quintada* were out of sight and touch.

The death wish that he had been fighting washed out of his head, bubbled away out his exhaust valve as the air from his tanks breathed out his lungs. He was Robert Grey, Master Whalekiller! All sense of failure was gone. This was his work and he was here, in the sea, to kill the whale. In the sea to face *his* whale, doing a job that only he, of all the men in the South Atlantic, could do—a professional.

He stroked his flippers, driving straight to meet the whale. No thoughts of death or fear or mistake, he was surely competent; Grey knew exactly how he would plant this lance he carried. His *brio* was riding high, carrying him to the meeting with the sperm.

He drove up to the surface, porpoising briefly to check his line. The whale was close enough to see—the blowing spout, the hump sweeping up and down.

Grey reached to the shaft of the lance. A ring at its base came away to give him a short barb on a

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ring—a steel symbol of Mars; of manhood.

He went below the surface again. His approach was head on to the whale, in the blind spot again, as with the boat, but here in the water he was exposed to the sperm's deadly, toothed jaw. He had to see it as he attacked.

The house-wide, square head loomed out of the water's dimness.

With the heel of his left hand, Grey activated two of his jato packs. His speed tripled. He and the whale, now equals in swimming speed, rushed together at better than twenty miles an hour.

Now we decide, whale! Grey thought, driving himself up and angling off to the side. *Meet me, whale! Ishmael!* He had only seconds to react. The whale's giant cry shivered the water in an echoing hoot. The mouth gaped open, the whale's own ivory tooth-lances hooked at Grey's rising legs. Its eyes swept by; a feature in a streaking wall of blue-grey flesh. Grey's head broke water. He rode upward on the foreswell of the massive flipper. His position was just right.

He stabbed out with the ringed dart. The barb caught in the grey skin and held. He pivoted, his arm muscles locked, and he felt his feet hit the shoulder of the flipper. The flipper was driving up, the whale peaking it like a boat oar, just before he sounded. Konrad's boat was in front of the sperm. The whale would dive to avoid the now-noisy, splashing oars. Grey rode the peaking flipper up out of the water, abandoning the dart and gripping the lance to thrust it deep; deep to the full length of the steel shaft; in one convulsive spasm of his muscles. The shock and shudder of the stab ran up his arms—a true thrust—a killing-lance.

No mistake this time. The exultation of his pride roared, pulsed his blood in a silent cry of emotion. *Ishmael!*

Grey's balance was a thing of combined movements and timing. He lost it instantly and tumbled off into the water, diving deep. Both hands slapped at the jato packs and he drove down and away. He had seconds to avoid the whale's descending flukes and behind them the two whaleboat lines whipping through the water from the harpoons.

Blamm-whurrp!

The concussion of the whale's upflung flukes slapped through the water, deafening Grey, but telling his safe distance from the stroking tail. He was safe; swimming clear. He felt, rather than saw, the shadow of the whaleboat as it swept over him. The shock of the contact was leaving him rapidly, as it did, to be replaced by the triumphal elation of a good killing-lance.

He swam to the surface and raised his arm for the pickup. Konrad, with his uncanny sense of what was happening in the water,

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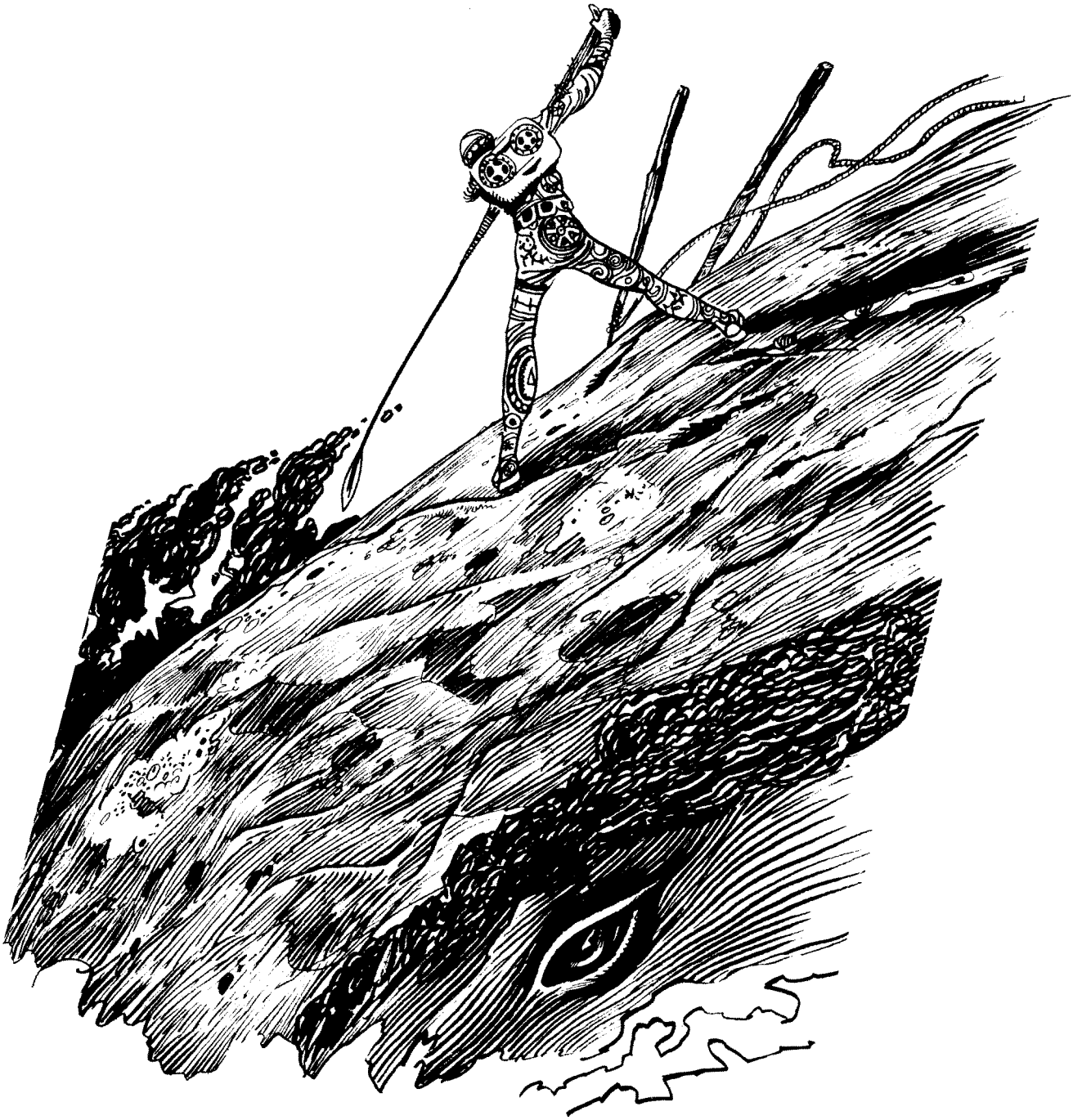

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was less than three fathoms away. The boat slewed in and Grey caught the peaked after-oar and the line-oar. The oarsmen pulled him in, their faces shining with an equal triumph.

"Red flag, *Majestad,*" the line-oarsman said. The whale had spouted blood. Grey's lance had gone into a lung or a large vein that flooded into the lung airspace.

Konrad had the boat headed across the arena circle. As soon as Grey was seated, the oars dipped and pulled to a fast beat. Two lances had been placed, *cabeza-a-cabeza.* The next phase was the blood chase—force killing the dying sperm. And Grey had to follow the boat fleet, now.

The harpooneers in the towed boats would pull in the lines and each thrust a killing-lance. Grey had put in the first boat-lance, and the second from the water, showing his skill and great *brio,* when the whale was fresh. Now, the boat harpooneers would lance the great sperm, wearing his massive vitality down, until he was near death.

When a Ceremony was fought with two or more Master Whalekillers, this phase was taken in turn, with each *Majestad* showing his skill and dominance. In a Single Cetus like this, Grey was permitted to use boat harpooneers in what was an ungraceful, bloody business. The really brutal part of cetomacy, that was always emphasized in condemning articles. A sperm male took a very large amount of killing and no one expected Master Robert Grey to risk his life in the mid-fight lancings.

The first boat was already up to the whale, when Konrad joined the fleet. Cooper's boat, its oars peaked, the men pulling it in by means of the line purchased around the loggerhead, was touching the back of the whale—forward of the hump, near the flippers. The harpooneer was poised, as the boat worked forward. He stabbed down, swung his body from side to side, to churn the lance in the whale's flesh, and was almost torn into the water. The whale slapped his flukes and put on a burst of speed, running away from the boat briefly as Cooper let the harpoon line burn out to give him a safe distance again. He steered the boat out wide with his oar and dropped back behind Paget's position.

One at a time the other two boats pulled in, lanced the stricken whale and slid out, but the great sperm still swam through the water. The Ceremony was beginning to stretch out, Grey had no real idea of the time, but it was upwards of four hours.

Grey went in the water again, taking the whale on its starboard side, a highly dangerous pass. The whale was turning to port to circle the arena and so would be turning away from Grey when he made his grab for the skin to stand up on the flipper. He would have a

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shorter time to plant his lance—the whale seemed to dive more quickly to port. And his boats were on the wrong side to help him. Also, he had to reckon with the heavy tail flukes. As the whale sounded it turned away from the sonic fence. The tail flukes would slap water very close to Grey if he delayed his roll-off after the lance.

He was confident enough now, sure in his dominance of this whale, to assess these factors coldly, one by one, and plan his technique to meet them. His swim-in was flawless and the starboard lance went in deep and solid. The whale spouted and Grey had the rare chance to see the red-flag—the blood spout from his own lance—before he rolled off the flipper.

Konrad was close and picked him up fast in a slap-dash manner. Grey flicked up his face-mask to see what was wrong. Konrad wouldn't have rushed a pickup unless there was something wrong. Grey came aboard at the bow and stayed at the harpooneer's station—he might be needed.

The whale had not sounded, as expected. It merely dipped under in a shallow dive and back up again. The quick move had caught Cooper's boat with its lines all running free for the sounding. They slacked; and the whale turned.

Within seconds the trawler-sized animal swerved in the sea, ran at the number-two boat, turning like a porpoise in its own length. The sperm's square forehead smashed into Cooper's oars, three-quarter on. It slid the boat sideways for a bit, breaking oars and tossing two men clear. Then the boat caught, rolled, and floated bow-down in the white wash for seconds, before the sweeping flukes smashed a thousand pounds of driving whale flesh down to drive the whaleboat into the sea.

Konrad swerved toward the wreckage, calling quick-stroke, headed for the men in the water. From the inside of the whale's circling line, Leith's number-four boat, the safety boat, was also stroking.

"Copters!" Grey called briefly. He'd seen the two medical copters lift off the factory ship. Konrad nodded and nosed into the floating wreckage.

The whale swerved back into his line and swam away, towing the two boats as if nothing had happened. It swam slower, seeming to take on a dignity now that it had struck back. No longer a fleeing animal, the lone whale had demonstrated its power against the tormenting boats. It swam steadily, proudly, but the blowing spout was tinged with pink. The steel lances were killing it.

Grey pulled his eyes away from the whale, searched for men in the wreckage. The Ceremony was suspended for the time. The men in the water had minutes to live—the

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Antarctic cold could kill, and only Grey wore a protective wet-suit.

They found two men, quickly, dipping two oars under them to help them aboard. A copter hovered over the boat, foaming the water, and the line-oarsman caught the sling. Both men went up together, there was no time for standard procedures. The men were freezing. Grey saw Leith pick up someone, and the second copter was dragging its sling in the water.

"Grey!" A bullhorn shouted at him from the copter. "Grey! Your wife—safe! Rescued O.K. Flying here! Grey?"

Grey threw up a hand to acknowledge. His eyes blurred with emotion he had to fight. *Jeninne! Oh, Jeninne!* Even with the joy he felt, there wasn't time to think of Jeninne, now. He needed his eyesight to find the men in the water.

There, another! He pointed, but Konrad was already throwing his weight on the steering oar. The copter trailed them in to the pick-up dangling its cable for quick recovery.

The man in the water was Cooper, alive, but too weak to get in the boat. Grey went over the side and worked him directly into the copter's sling.

"We've got them all, now." the bullhorn said. "Seven men, O.K." The copter was angling away toward the factory ship even as Cooper's dangling body rose up to the door. Seven men. The whale hadn't made a kill!

Grey swam back to his boat and went aboard over the line-oar to sit beside Konrad again.

"Get us back to the whale!!" he ordered. "Seven men, Konrad. The whale didn't make a kill. He's still mine. Get me over there, man. I'll plant the killing-lance, yet."

"Ishmael!" was Konrad's reply and he pushed up the rowing count and sheared the boat around. Leith dropped in behind and they headed back for the whale's swimming line. The attack, crash and rescue had been quick; a brief flurry to excite the *aficionados,* but the whale was still there, swimming, and Grey had to meet it again. This time would be the last. Grey was tiring, and the whale—the whale must be near death.

The sperm's spurt of speed had been brief. Its every spout now was pink with blood-froth—some deeper red. Runnels of color marked its head from the blowhole whenever the whale left it out of the water; which was more and more often, now. The whale didn't sound, it just made shallow dives.

Paget was rowing into the whale again, holding his line taut. His after-oarsman took up the line as they moved in to the whale. His harpooneer struck and drew a bright spout of blood—and another.

"Take us in!" Grey said. The whale had swung around in a short circle, turning in its own length, its

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tail flukes hardly rising to the surface. The lines on the port boats were all slack. They could tangle, have to be cut, if the whale ran again. But it wouldn't. Grey could place his last lance now. The death circle was a final signal.

Konrad worked the boat up toward the big body, steering over the flukes. The oars were coming out of the water, trailing carmine droplets. Grey's boat was moving through the whale's blood-wake.

Once more Grey moved to the bow. He left his flippers. This time, this lance, he would plant with a technique that was his own. No one else used it. The TV *aficionados* would be hanging on their seats waiting for his move.

The lubber-pole was in place again and Grey used it for balance, as the harpooneer strapped the cleat-shoes on his feet. A flemished rectangle of line covered the top of the clumsy-cleat to protect the razor-keen edges on the cleats as Grey stepped up on the thwart. He stood poised, looking at the whale. The harpooneer handed him the last lance.

Don't die yet, whale, his thought ran. *We have one more trick, you and I. For the crowd, whale. Wait for me.*

The boat swam through water, red with the whale's blood. This last lance was only a showpiece—for the aficionados. Grey *could* stand by and wait. The whale would die in minutes, no matter what he did. But the watching millions would storm him with abuse if he cheated them. His *brio* demanded one more lance, planted with maximum danger—or at least, with the appearance of danger.

The boat's hull touched the whale, rode along, grey-skin-to-wood.

Grey sprang outward. He landed on the whale's broad back and ran lithely forward, toward the heavy hump and the forest of harpoon sockets. His cleats knifed into the thick skin, held him on the wet surface. The whale slid through the water under him with an inert movement, barely swimming. The whale was moments from death, but to the watching TV cameras, zoomed in for close-ups, Grey's brilliantly painted wet-suit tight in their focus, his action appeared incredible, tremendously thrilling—a final act of bravery, this tiny man, alone on the back of an eighty-ton sea monster.

Grey reached the spot he had been aiming for, and lifted his lance high. With a convulsive jerk of his muscles, he stabbed deep, driving his shoulders down almost to his knees as the lance-head sank into the whale. The wide back shuddered once, an earthquake quiver beneath his feet and a slapping crack sounded behind him as the giant flukes rose and fell in a final spasm.

Grey jerked the lance out, hand-over-hand, and stabbed again—deeper.

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The whale spouted once, a low, wide spray of bloody mist that fell around Grey, smearing his face-mask, running down his arms and shoulders as he lifted the lance a third time. The long shaft was curved and bent, now, but he thrust it deep in the thorax, half-blinded by the blood-spray.

The whale began to roll to starboard. Dead at last, it lay over against the waves.

Grey released the lance, stepped sideways to walk with the roll, and lost his footing. His cleats missed their bite and he fell.

He hit the whale face down and began to slide. His wet-suit and hands, slick with blood, could not hold him. He planed, penguin-like, down the rolling side of the whale. For an instant he fought his head up. His face-mask partly clear, showed him the horror of the whale's open jaw. He was sliding head first at the pointed ivory teeth. The whale's dying spasm would close its mouth, grinding down on Grey as he slid into its deadly bite.

Frantically he shoved out his arms, pushing at the wet skin. The whale had won after all. Grey had made another mistake; and the whale was taking him. He felt his body fall free, into the water. His arm passed straight into the gaping jaw. He saw the shape and color and number of those teeth; the rolling fold of flesh at their root; the ridged roof of the mouth; all in stark detail, then the blinding red-black flash of pain hit his shoulder. He heard the snap of his arm bone as his body swung into the sea. The conical point of a tooth bulged the fabric of his wet-suit on top of his arm, punched through as easily as it had pierced his arm, and gleamed white against the suit. A welling of blood, his blood, flowed to wash down his arm, mix with the whale-stain and dissolve away—indistinguishable in the sea—then nothing.

He came back to screaming pain, bubbling the mouthpiece away and choking on the brine. The harpooneer was in the sea beside him, lifting his arm off the spearpoint of the whale's tooth. The man had jumped in his boat-clothes; the sea-cold would kill him in minutes.

Hands dragged the two of them into the boat, heedless of pain and oars and equipment. Grey's arm must have a tourniquet; his adrenaline level, with his heart beating to keep his body warm in the Antarctic water, would pump the blood from his veins in minutes. The harpooneer fought his way back to his oar and began to row, doggedly forcing exercise to help him fight the freezing cold of wet clothes. He was wrapped in canvas as a windshield and a wine-skin was poured into him, then all the oars were manned.

Konrad was setting a crash-speed rhythm. He had to get back to the

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Skua Harvest. Grey and the harpooneer needed immediate medical care. And the copters were flying back to South Georgia Island with Cooper's crew. The sweeps dug deep; pulled hard.

Ear-rending trumpet blasts and timpani pulsed, swelled: the closing *Melville* movements welled across the arena.

The whale was fin-up and awash; Grey had made his kill; the Ceremony was over.

Someone on the *Skua Harvest* with binoculars on the final lance had seen Grey's accident, however, for the whalecatcher was turning inside the Arena, headed for Konrad's boat rather than the whale. *Skua* was steaming full, a white bow-wave already curving up on both sides as she headed in.

Behind Konrad's stroking boat, Paget had moved into the whale. He was flying his red-waif flag to signal the kill and he would pull up to recover his harpoons and, with the help of the other boatcrews, sever the sperm's great tail. The heavy flukes would be allowed to sink back into the sea—to keep the whale's spirit from swimming forever in lonely seas. So the whalekillers paid tribute to a superstition as old as their craft, and at the same time made the massive carcass ready for hauling into the factory ship. Grey's whale, no longer a violent antagonist, was destined for the flensing decks, to become food and oil—a use and purpose far beyond its short six hours of glory in the arena.

Whalekiller Grey, riding unconscious from his pain, seemed to be swimming still, through golden water. He swam in company with a mighty sperm whale, young and vigorous in its strength, and a slim, dark girl, haloed by light in her beauty. Grey swam; one of his partners faded and dimmed, the other grew strong and solid, became reality itself, until—*Jeninne! Jeninne!* The face with its dark halo of hair hovered over him as he was lifted onto the whalecatcher's deck.

The smoky-grey whale sounded silently into the depths, its flukes rising high and sparkling diamonds over all the world. ■

The Analytical Laboratory July 1973

PLACE	TITLE	AUTHOR	POINTS
1.	The City of Ul Chalan	*Richard K. Lyon*	2.16
2.	A Bridle for Pegasus	*Anne McCaffrey*	2.26
3.	Young Beaker	*J. T. Lamberty, Jr.*	3.16
4.	Godsend	*Edward Wellen*	3.67
5.	Peace Probe	*Roy L. Prosterman*	3.71

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Notes from Magdalen More

L*Z*R*S L*NG

Any similarity between the following notes and "Notebooks of Lazarus Long," from our June 1973 issue, is strictly, uh, well . . .

■ Any instant idea is suspect—it is either superficial or a cliché.

■ A man should never let his wit trap him. The witty man often finds himself the victim of aphorism. He is unable to hold a true conversation, for he speaks only pithy quotable observations. Such a one has no friends. He has only students, or, heaven help him, *followers*.

■ You can always tell saints—they never tell *you* what they are.

■ A boor speaks clichés; a wit creates his own.

■ Innocence is not ignorance. There is a difference, and if you plan to be a "sweet young thing," keep it in mind. Learn everything you can about sex, but do not ever speak your knowledge. Show it subtly, deceptively; that is, be able to blush at the most obscure references. This can be highly entertaining for everyone concerned, especially for the "sweet young thing."

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■ Are they making love or fighting? Both?

■ Nothing tastes good when you have to eat alone.

■ Life is like a *crème de menthe* bottle—it looks much fuller when you invert it.

■ There Ain't No Such Thing As A Free Lunch. There are, however, cheap ones aplenty if you know where to look.

■ I am often grateful that I am free of the personal ignorance many men have. I am sometimes resentful that many men know themselves better than I. This makes me even with humanity, in case you were keeping score.

■ Sex is a comforting aggravation.

■ No man is an island, but I have met many isthmuses and a few peninsulas.

■ Cookies are better comfort than religion—more immediate and understandable, and hardly likely to do any lasting harm.

■ Massage his scalp.

■ What is man but a mote of dust to the universe? Why, he *is* the universe! All we ever can know is ourselves.

■ Always carry a grapefruit. ■

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ALFRED D'ATTORE

An Earnest of Intent

**You know the story about the stubborn mule?
Treat it with kindness—
after you've hit it hard enough to get its attention.**

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Daniel Marcus Friedman, Major, United States Air Force, was not given to introspection. It wasn't healthy in his business, certainly not while traveling at four hundred knots, fifty feet above the water. He was trying to concentrate on his flying, holding his altitude, heading and airspeed very accurately . . . But his mind kept going back

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to the meeting at the base.

"An earnest of intent," they told him. The phrase was descriptive. From the Cuban Crisis, he remembered. Left-over jargon from the literature of the day. It meant a sort of down payment, a token of good faith. But it had another meaning too: it was an omen, a presage of things to come—

The compass moved slowly, almost imperceptibly off heading. Major Friedman nosed the aircraft gently in correction. There were no landmarks to check, only open sea. The ripples were small on the water, so wind was negligible. Navigation would be no problem. Tientsin's harbor was quite large.

He broke the seal on the special weapons panel and armed the weapon. It was set for an air burst. This was a first, he realized. Heretofore, no fighter-bomber crewman had ever done that. He turned the radar to standby. For a while, his thoughts drifted. They were not pleasant.

They would retaliate, he reasoned. They must. The way he saw it, the strike at the *Cormorant* was a calculated risk, not a bluff. He thought of his wife and two children. How many times would they hit the base, he wondered?

Seeing became difficult, so he nosed up a bit and removed his sunglasses. He blinked rapidly in the cool air of the cockpit until his eyes cleared. Then he replaced his glasses. He was getting close to Talien, and he couldn't afford to do that. He resumed his former altitude, then checked his fuel. But there was no problem there, not this mission. It was a cake walk as far as flight profile was concerned.

A flashing red light on the right console shot adrenaline through his system. Radar scan, he thought, but it was intermittent, so they were not tracking him yet. Not surprising, that. He was very low, and his course was such as to maximize his distance from land at all points until he reached the harbor at Tientsin.

He heard some static on UHF radio. Some new "friend" was checking in. Even that small sound jarred him. He shook his head in annoyance. He was pretty much unnerved, he realized, less professional than he had hoped he might be in such circumstances. But there was a sense of the unreal about all this. Daniel Friedman was normally a relaxed type, confident and self-assured. This, however, was like some almighty convulsion. Too much was happening, too fast. There was no time to get things straight.

He stole a quick glance skyward. There was high cirrus, going to five-tenths. And water below. Such conditions made for relatively high thermal reflectivity. Thankfully, he was carrying a low-yield weapon.

Talien was off his right wing. There was no indication of pursuit, no radar track that he could dis-

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cern. He made a slight heading change. Tientsin was now dead ahead.

He thought about the city, the people unknowing, unsuspecting. Between Tientsin proper and the port areas to the east, the population ran in excess of five million. How many would he kill, he wondered, directly? How many indirectly? And this was just the beginning—

He pulled up into a shallow climb and removed his sunglasses once more. With the back of the same hand, he wiped at his eyes. *Why the nuclear strike?* he asked silently. *Why such desperate measures? Why?*

Jonathan Kevin Harcourt, Secretary of State, was short, heavyset, and balding. He had a rumpled, disheveled look as if his clothes did not fit. He appeared to be uncomfortable, and he was. For he was acutely conscious of his appearance. It was a source of much distress, and at times, it made him press too hard and overreact. It was a genuine debility, and it was unfortunate, for behind the bulbous, sweating countenance, the intellect was penetrating, analytical, and altogether sound.

He sat down and looked around. Two of the other statutory members were there: the Secretary of Defense and the Director of Emergency Planning. The President and the Vice-President had not yet arrived. Of the unofficial membership, most were already in evidence. The Joint Chiefs of Staff were seated, as was Dr. Stanley Hanson, the President's chief adviser. There were a good many others.

A solemn assemblage, thought State. Dr. Hanson looked particularly grim. State wondered how far Stanley had gone with the President on the crisis. He tried to read the doctor's expression but with no success. Thankfully, Hanson's was a calm, sure intellect. That was a decided plus.

State continued his silent inventory. There were Budget and Treasury. Both were out of it, substantially. In these matters, they were little more than interested observers. O'Malley, the young Attorney General was there. He had a seat next to Dr. Hanson. Normally, he did not attend council meetings. But his presence was hardly a surprise. The President set great store by him. State agreed. He knew O'Malley to be sound on policy matters. That was another plus.

A hush fell on the chamber. State turned toward the entrance. Edward Coniglio, Vice-President of the United States, had entered. He was a bluff, handsome man with a presence variously described as arresting, imposing, even commanding. He was alone. He carried no brief and had no aides. State's lips compressed. Typical, he thought. It was a fetish with the Vice-Presi-

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dent, disdaining the accouterments of office.

Then he shook his head. He was annoyed with himself. He was letting an innate dislike for the man cloud his judgment. No, Coniglio was many things, but he was no posturing fool.

Rather, he was unique, one of a kind, resembling in no way the top-level political figures of the day. He held strong, individual opinions, markedly opposed to the policies of recent administrations, including—to some extent—the present one. He expressed these views candidly, with no apparent interference, real or implied, from the President. And he was a lucid, remarkably persuasive speaker. Demagoguery, thought State, cast in the mold of a modern-day Cicero.

Worst of all, Coniglio had the President's ear. This, and the President's illness, his extreme frailty, held ominous portent for the future. Many a high-level government official, of like mind with the Secretary of State, said fervent prayers for the President's return to health and vigor.

The Vice-President nodded his greeting to the members absently. He was preoccupied, his normally open countenance clouded and troubled. He picked up one of the sharpened pencils before him and exchanged it end for end through his fingers, bringing the point and eraser alternately in contact with the table. His eyes regarded the action but quite obviously took no notice of it. It was a small display of nerves, but it was out of character. Well, thought State, interesting. A chink in the armor. It was reassuring.

He cleared his throat. "Stanley," he asked of the President's adviser, "what have you recommended to the President?" He spoke the words softly, but they were heard, nonetheless, throughout the chamber.

"We have not discussed ways and means as yet, Jonathan," answered Dr. Hanson. "It's a complicated situation."

"I agree," said State. "The thing to avoid at all costs now is precipitate action." He turned his eyes to the Vice-President, meeting the latter's cold stare and holding it. Then the President arrived.

Everyone rose. Bradford Elliot Coulter, thirty-eighth President of the United States, was tall, gaunt, and very obviously ill. He took his place at the head of the huge table and smiled toward the Vice-President. He nodded to the others in unison. "Sit down, gentlemen, please," he bade them. He turned to General Garretson, Chairman of the Joint Chiefs of Staff. "General, would you bring the council up to date?"

The general nodded to Admiral Bradford seated to his left. The admiral gave a prepared memo to the recorder, then read from a copy. "At 0600 hours, Greenwich Mean

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Time—" he stopped and explained, "early afternoon where the incident took place." He resumed the text: "—the U.S.S. *Cormorant,* electronics surveillance vessel of the Pueblo class, on station, 37 degrees, 20 minutes north latitude, 124 degrees, 05 minutes east longitude, was hailed by the Chinese destroyer, *Lin Tao.* The *Lin Tao* was accompanied by four large gunboats. The *Cormorant* was ordered by radio to heave to and prepare for boarders. The order was repeated twice, at two-minute intervals. Commander E. F. Cummings, in command of the *Cormorant,* made no reply. Instead, he implemented long-standing orders for security of classified materials and ordered the forward gun of the *Cormorant* manned.

"At 0605 hours, GMT, the Chinese flotilla opened fire. Two rounds from the *Lin Tao* destroyed the forward gun of the *Cormorant* and most of the bridge. Commander Cummings and his first officer were killed instantly. The Chinese continued their attack for thirteen minutes, but with small arms only.

"At 0630 hours, GMT, after a full report of the incident was transmitted and acknowledged, Lt. Commander B. G. Osterman, the second officer, surrendered the ship. Of the *Cormorant*'s seventy-nine crew members, seven were dead, four wounded. All survivors were taken prisoner."

The admiral looked up expectantly. The Attorney General was the first to speak. "Admiral, you said the report was transmitted and acknowledged. Acknowledged by whom?"

"The transmission was received in many places, in Korea and aboard a number of ships at sea." The admiral laid the memo on the table and continued. "You see, Mr. O'Malley, all messages were sent in the clear, ours and the Chinese. No visual signals were used. No messages were coded. With respect to our radio broadcasts, the Chinese made no attempt to jam."

"There must have been provocation," broke in State. "Our relations with the Chinese have been good for some years now. They would not jeopardize our good offices without reason."

"There was none," answered General Garretson. "The coordinates provided are the *Cormorant*'s own. But they are quite accurate, having been confirmed from many points, independently. The U.S.S. *Cormorant* was in international waters."

"An openly aggressive act," mused the Attorney General, "for all the world to see." He turned to the President. "But toward what end?"

The President looked toward the director of the Central Intelligence Agency. "Perhaps, Martin, you might like to answer that."

Martin Alder was small, thin and waspish. He was proud of his orga-

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nization, and most of the time his pride was justified. State had always found the director reasonable and cooperative. But it was in the nature of overlapping jurisdictions that the parties cooperate or accomplish nothing. State was wary of Alder. He knew him to be a strong advocate of the Vice-President. That made his interpretation of somewhat more than passing interest.

"You are correct, Mr. O'Malley," began Martin Alder incisively. "It was an openly aggressive act, daring and provocative, and deliberately so. The Communists feel they are now militarily superior—at all levels. They are ready for greater and farther-reaching adventures. They are virtually sure we will shrink from a final encounter, much as we have in the past—"

"Mr. President," interrupted State. *Damn him,* he thought. "I protest—"

CIA raised his voice. "This is a test, the final test, I might add, of—"

"Mr. President—" interrupted State again.

But CIA would brook no further interruption. Glaring straight at the Secretary of State, and in a very loud but still controlled voice, Alder pressed on: "—a test of our determination to contain Communist aggression." He paused momentarily and regarded State with open hostility. Harcourt was disarmed, despite himself. Except for the damnably dangerous situation, he would have laughed aloud. That bantam rooster was literally daring him to interrupt again. But State offered no further comment. "How we handle this affair," went on CIA, "will determine our efficacy as a force for peace and stability in the world."

State remained silent until he was sure CIA was through. Then he began in a low voice. "Mr. President, such interpretations are highly speculative, inflammatory, bound to create an atmosphere—"

"But I agree," interrupted the President. "Martin's points are well taken." He turned to the council at large. "The Chinese make no denials. They maintain the mission of the *Cormorant* was prejudicial to the best interests of the Chinese People's Republic." He smiled mirthlessly. "That covers a multitude of ills, real or fabricated."

CIA carried on. "The words were carefully chosen. They are a studied and patent slur. In effect, they are daring us to do our worst. 'Under which circumstance,' to quote their English language broadcasts, 'questions relating to territorial cognizance are entirely immaterial.' So goes the current propaganda. Broadcast to the world, I might add. One cannot help but wonder what will ensue if the United States 'fails' this test."

The President smiled again. "The world awaits our reply, gentlemen, with bated breath. Which, of

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course, is why you are here."

"What is Russia's position?" asked the Secretary of Defense.

State cleared his throat. "They are noncommittal," he answered, then lapsed into silence.

The Secretary of State was a sensitive man. He was as much attuned to the tenor and tone of a discourse as he was to the words. And presently, he was disturbed. He felt a great apprehension for the direction the council was taking. He determined that another area for speculation had to be opened quickly, before confrontation could become a fixed idea.

"Mr. President," he began, "that interpretation—that view—must be speculative. We cannot know what is China's true motivation. This may be another propaganda ploy. Tweaking the tiger's tail—so to speak—once more."

"I don't think so," said the President.

"Face facts," said CIA. "It's about time you did."

State flushed angrily and was about to reply, when the Vice-President interjected a question. "Where is the *Cormorant* now, Martin, and the crew?"

"The *Cormorant* was taken to the harbor complex east of Tientsin. The crew is in a test camp near Peking, one of those well-staffed, complex affairs used during the Korean War for research into the control of human behavior. The prospect is not pleasant for them, I'm afraid."

The Vice-President nodded. Then he addressed further questions toward CIA and the gathered Defense Department personnel relating to the crew, the harbor at Tientsin, and the *Cormorant.*

Meanwhile, Jonathan Harcourt considered the situation. Of the participating members, he felt he could count on Dr. Hanson and Defense for support. Strange, thought State, that the Secretary of Defense should be so at odds with his own personnel. He felt fairly sure of O'Malley too. Powerful allies, those three. On the other side stood the Vice-President, the Joint Chiefs of Staff, and Martin Alder. An equally formidable array.

It seemed ironic to State that Martin should evoke the specter of reality. The underlying, all-encompassing "fact" of an ill-considered response was nuclear war. It seemed inconceivable to State that sentient beings could weigh such a possibility in the balance. As if they were conducting a trade-off study, with annihilation in the offing, a measurable, calculable alternative—

The three-part discussion was over, so State addressed the chair. "Mr. President, our reaction should be carefully considered. Slow, deliberate, made if possible in concert with our allies. World opinion must be rallied. The facts are, after all, in our favor. First and foremost,

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we must appeal to the United Nations. Then, we must consult with our chief allies–"

"That," interrupted the President, "is a possible course of action. One, I might add, that I'm well familiar with. There are others. It is the others I should like to hear."

"Retaliate," said General Garretson.

"Punitive measures," echoed Admiral Bradford. "Make them pay."

"How?" asked Defense, with some irony. "Another expeditionary force? That should make Vietnam look like an afternoon tea."

"That is not what I had in mind," replied the admiral. "We can react with much more force and much less commitment."

"Nuclear weapons!" exclaimed the Attorney General, astonished.

"Unthinkable!" blurted Budget, then flushed. But the members seemed to approve the declamation.

"Exactly," said State coldly. "And with that judgment, let's table such recommendations permanently."

"No," said the Vice-President. "I should like to have that alternative examined closely, and soon. The how, the where, and the possible ramifications."

The members of the council were dumbfounded. They turned as a body toward the President, expecting at the very least some modification. Even the Joint Chiefs of Staff were surprised. They regarded the Vice-President as basically one of their own, but this immediate, unqualified support was unexpected.

The President did not answer right away. It seemed to the council members that the Vice-President's interjection had caught the President unaware. Finally, the President nodded.

The silence in the room was palpable, like some physical thing. Stanley Hanson spoke first. "Perhaps," he began quietly, "retaliation in kind–precisely in kind–is exactly right." He waited until he had the council's full attention. "Unlike North Korea," he continued, "China has an appreciable fleet. This makes her vulnerable to the same extent as we. Let us play tit-for-tat. We'll commandeer one of her vessels. Take her crew captive. Then we may barter on more even terms."

The council took a moment to consider his words. Then the Attorney General grinned. "Trust Stanley to come up with something. It's good. Forceful, yet cautious too."

"It's a circumvention," commented CIA flatly, "however brilliant."

"Perhaps, Martin," answered O'Malley, "but not entirely so. It may be a way out of this damned situation. I like it more and more."

The Joint Chiefs of Staff were not enthusiastic, nor was the Vice-President. State had mixed emotions. He saw it as no solution.

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And if he judged Dr. Hanson's motives correctly, neither did he. But it might buy time. State felt that with time, a more moderate position would emerge, if not from the council, then certainly at the behest of Congress, the press, or public opinion. He determined to support the plan.

"I believe the plan has merit," he began. "I favor a less provocative procedure, but I can support this course of action. I believe we all can."

"Garbage—" began General Garretson, but his comment was drowned out in the general assent. The majority of the members were well-disposed toward the plan, even grateful. It presented a course other than the usual inaction. And it fell well short of direct confrontation.

"It has its element of risk, too," warned Dr. Hanson. "We cannot know what will be China's reaction." But the tenor of conversation had turned optimistic as member after member offered encouraging comments.

General Garretson had been watching and listening. His face was flushed, his eyes darting from speaker to speaker. Again, he started to interrupt. "A more direct approach—" but the enthusiastic discussion continued without pause. "I believe—" he started once more, but again, he failed. Finally, he could contain himself no longer. He stood up.

"Mr. President," he called loudly. This time, his words cut through the tumult clearly. State glanced at Defense in warning. "Mr. President," the general called again. His face was now scarlet, the creases tight and white about his mouth. The President nodded.

General Garretson leaned on his hands well forward over the table. "This is no plan," he stated emphatically. "It is tantamount to doing nothing. It is a stall."

The Secretary of Defense reached over and placed a restraining hand on the general's sleeve, but the soldier shook him off angrily. He turned back to the President. "What has happened to us? Have we lost our capacity for righteous anger? This is the *second* such incident. It is an act of *war.*" He exploded the word, simultaneously lifting a fist and bringing it down on the table violently. "We should be pressing an ultimatum. Instead, we rise to new heights in devising vacillation."

He stood back, the flood of words momentarily halted. He glared at the assemblage, his anger such as to preclude speech. Then he leaned forward once more and said in a strangled voice, "Not this time. We will not turn the other cheek. Not again."

Across the table, State bounded to his feet. "What the hell do you mean, General? Are you threatening the council?" The other members rose too. They were outraged. It seemed to them the gen-

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eral had given them a warning.

"Gentlemen!" called the President, rising to his feet and using the gavel for the first time. But the chamber did not quiet immediately. "Gentlemen!" he called once more, this time pounding the gavel repeatedly in slow cadence. The general fell back into his seat. He was perspiring heavily. He brought out a handkerchief and wiped at his cheeks and brow. The council members slowly began to take their seats.

"You sit down too, Harcourt!" The Secretary of State looked at the Vice-President. The words had come from him, soft-spoken, but flat and vehement. Edward Coniglio's face was livid, a mirror to tight, controlled fury. Again State had cause to be surprised. He had never seen the Vice-President angry before. Angry? Venomous was a better word.

State became aware that the chamber was quiet again. "Take your seats, gentlemen, please," said the President. The few left standing took their seats, State along with them.

General Garretson addressed the chair. He seemed to have quite recovered. "Mr. President," he said quietly, "there was no threat, real or implied, in my remarks." He paused to clear his throat. "Nevertheless, the outburst was reprehensible. I apologize—to you—and to the members of the council." He cleared his throat again. "It is just—"

"I understand, General Garretson," said the President quietly. "And I'm sure the members of the council can appreciate the frustration of our military personnel. We'll say no more of this."

The President remained standing. He addressed the council. "Gentlemen, we have now had three recommendations." He turned toward State, anticipating his objection. "Yes, Jonathan, three. I wish to have details for their implementation." He handed the gavel to Dr. Hanson. "Keep me informed."

He turned to leave and the council rose. The President laid a hand on the Vice-President's shoulder. He said quietly, "Edward, join me, please." The Vice-President left with his chief.

In the chamber, State sat nonplussed. He was much disturbed. Matters had not gone well. He looked up toward Dr. Hanson, his eyes mirroring his worry. The new chairman waved the recorder silent. For the while, comment was unofficial.

"Has the scepter passed?" asked Defense.

"Heaven help us if it has," answered State.

"That is a calumny," said General Garretson. "The Vice-President is an able and dedicated public servant."

State ignored the protest. "Stanley," he asked the President's aide, "is the President seriously considering an ultimatum?"

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"Seriously, Jonathan? Yes, he is considering it. But I believe he is considering all the alternatives. He must have them all fully examined."

"I think it is more than that. The President is desperately ill. And the further he sinks, the more he leans toward the Vice-President."

"But that's to be expected," said the Attorney General.

"It is not to be countenanced," answered State. "Not with this crisis upon us. Edward Coniglio is a dangerous man. It is time the Senate was brought into this."

"They are aware of the situation," said O'Malley.

"They are not aware of this turn of events," countered State. "The Senate Majority Leader should be informed." He got up to leave.

"Sit down, Jonathan!"

"What?"

"Sit down," said the Attorney General.

"I don't understand."

"I must ask you to remain. All of you. My people have been posted outside."

State collapsed in his chair. "But this is unbelievable!" he exclaimed.

The Attorney General said quietly, "The council has business to conduct, Jonathan. We have need of you here."

Jonathan Harcourt was in a state of consternation. *My God,* he thought, *has it come to this?* He spoke then, the words coming from a throat suddenly dry. "I had the impression—you saw things—much the way I did."

"I did. I do," answered the cabinet member gravely. "But the decision to go outside the council must remain with the President. It is when we disagree with the chief, that loyalty takes on its true meaning."

Stanley Hanson broke the ensuing silence. He said dryly, "Since an ultimatum is on everyone's mind, let's discuss that first. What form should it take? How do we follow up? What are the risks? The possible consequences?"

The President was seated low in his chair, elbows resting upon the arms, hands folded over a brandy glass. He took a very small sip. He thought idly of his personal physician and grinned.

"Mr. President?"

President Coulter looked up at his subordinate seated across the room. "Pardon me, Edward. I was thinking of Dr. Wiley." He held up the brandy glass. "How he would fuss."

The President lapsed into silence again. He thought of his past relationship with the Vice-President. In all the important ways, Edward had supported him unswervingly. He was loyal to a fault. And while his views were individualistic, in some ways unique, he never overstepped bounds.

Their relationship was a good one, ideal really. It was cordial, re-

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spectful, but never intimate. Like a commanding officer and his executive.

Of course, that was exactly what it was. And it explained why the President's imminent death had brought forth this apparent change in Edward Coniglio. This was the real man emerging. A remarkable personage, this Vice-President.

He thought of the recent council meeting. It had been disappointing. But it was really nobody's fault. Truly, there were but two real courses of action: to confront the Chinese, or to do nothing. The latter, typically, with its attending footwork. Speaking of footwork, perhaps Dr. Hanson's plan—

"Stanley's plan," he said abruptly, "you don't approve. Why?"

"It avoids the issue, Mr. President. It accomplishes nothing of lasting importance. It may buy a little time, but to what avail? It may make matters worse."

"Explain."

"Well," continued the Vice-President, "we have answered a very serious act of aggression with—how did Martin put it? A brilliant circumvention. No one will be fooled. No one that counts.

"Then too, the Communists have a habit of upping the ante whenever we do less than call their hand completely, unequivocally. How far are we prepared to exchange 'tit-for-tat'? Mock trial for mock trial? Execution for execution? It would be entirely in character for the Communists.

"On the other hand, Mr. President, a cautious approach would prove equally futile. Even if we could digest this latest humiliation, it would not end there. This is prelude. It is the final test. If we falter now, the least we may expect is repeated and incalculable blackmail. And the next adventure? It would be in Taiwan, Israel or Berlin."

"What would you do, Edward?"

The Vice-President looked at his chief closely. "It would be easy enough to give you an answer. But the decision is not mine to make."

"The decision might well be yours, Edward. Or yours to live with. What would you do?"

"I would strike back, Mr. President. Hard. Overwhelmingly. One plane, one bomb. I would take out the *Cormorant* in Tientsin harbor and a portion of the city with it."

"You would go that far? Nuclear weapons?"

"That is the most important part, Mr. President. There was never a time since World War Two that we could match the Communists in total conventional warfare capability. Our superiority was based upon nuclear weapons. Unless we are prepared to back our military action with nuclear weapons, conventional warfare—measured reaction, so-called—can buy us nothing. Now, they are virtually convinced we will never use the bomb. We

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have gone to great lengths to assure them of this.

"Short of a massive confrontation, Mr. President, this may be our last chance to turn them around. We must establish our willingness to risk it all, if the need arises. We must give an earnest of our intent. Now. And it must be unequivocal."

An amazing declamation, thought the President. Well-reasoned and cold. Especially the latter. And therein lay the difficulty, for it gave the Vice-President a blind spot. Ultimately, did it not impair his judgment? Difficult to determine, mulled the President. Difficult. In all other ways, the President realized, Edward Coniglio was almost ideally suited to the Presidency. He had the training, the intellect, and—he had to admit it—the raw courage.

"Edward, it could lead to World War Three."

"Yes, Mr. President."

And there it was, thought the President, the blind spot. It was not that the Vice-President did not appreciate the possible consequences of direct confrontation. He simply did not permit it to alter an otherwise logical conclusion. As for the immensity of the act itself? That, apparently, was no consideration at all—

Yet, this was the next President. And this was the course the country would take. No mistaking it. Notwithstanding any action Bradford Coulter could take to preempt his subordinate. The other courses of action were by their very nature delaying tactics. That meant the Vice-President would have his way—in the end. And quite soon. Death was that close.

The President bowed his head and put two fingers to the bridge of his nose. He was tired. He wished he could see this thing more clearly. It was just possible they might get away with it. And if they did—aside from humanitarian considerations—it would auger well for the country's future. The world, for that matter. "But do we dare?" he murmured aloud. "Do we dare?"

"Yes, sir," answered the Vice-President. "We must. Because they do. And as long as they dare, and we do not—they must win, and we must lose." The Vice-President stopped for a moment and waited for the President's reaction. But the chief executive made no comment. "Have you thought, Mr. President, of the risk China takes with this act of piracy?"

"They know us well, Edward."

"Not so well as that, sir, or there would be no need to test."

The President considered the words. His subordinate seemed to have all the answers. Had it occurred to Edward, he wondered, that there might be alternatives to victory? That the price of freedom might actually get too high? It was a surprising notion, that. But having framed the concept, he realized

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immediately its essential truth. It summed up the situation well. Brutally, but well.

The President leaned forward. "Edward," he asked softly, "would losing be so bad?"

The Vice-President's face remained impassive. He said levelly, "You're overwrought, Mr. President. Tired."

The President's eyes narrowed. There was a slight edge to his voice. "Answer me, Edward. Is freedom so important?"

"Freedom has nothing to do with it," said the Vice-President. "We would lose. That is everything."

The President nodded ever so slightly, then he leaned back in his chair again. *So be it,* he thought. The decision was fixed. He could not alter it. But he could clear the way for the next President. He could make it easier for him—in the aftermath. He smiled inwardly. How neatly their roles had changed.

He looked up. "You would use an ultimatum?"

"Yes."

"Allowing how much time?"

"Not more than four hours, Mr. President. Once the ultimatum is given, the situation at home will become difficult to manage. Congress, the press—"

"Is it possible, do you think, that China might accede?"

"No, Mr. President. We would have to carry through. I'm sure."

The President nodded again. He picked up his brandy glass. The contents were virtually untouched, but still he did not drink. He held the glass instead motionless on the arm of his chair. "Thank you, Edward," he said.

The Vice-President got up to leave. He hesitated a moment with the door open and regarded his chief intently. The President was immersed in thought. He had not moved. The Vice-President closed the door.

Major Friedman shook his head. This wouldn't do, he knew. He was at five hundred feet. He nosed down to his former altitude quickly. He replaced his sunglasses and concentrated upon the aircraft. That was the way, he thought. Keep busy.

He went through his check list ending by engaging the bombing computer. He readied the aircraft for bomb release. Everything was in order. The cockpit clock showed a couple of more minutes to go.

Just two minutes, he thought. He needed more time. Something was nagging at him. *An earnest of intent* . . . the phrase kept coming back to him, as if there was some important message there. Something quite apart from his orders—

Land! He was there. Incredible, he thought. It was too quick, too easy. No hitches. No difficulties. Armageddon, just like that.

He increased his airspeed to six hundred knots and held it there.

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All was in readiness. He swung the aircraft marginally right and lined up on the *Cormorant.* It was harbored at T'angku, the northernmost port at Tientsin. He aimed for the forward mast. Just before passing over, he cut in afterburners. He depressed the bomb release button and pulled up, following a timed "G" schedule. The aircraft started into its loop.

Under control of the bombing computer, the weapon does not go immediately. But if the pilot keeps the button depressed, bomb release is assured. It is automatic. At the appropriate angle and range, the bomb would be lofted upward and minimally back, its trajectory such as to permit the delivery aircraft time to escape the effects of its own weapon.

But the bomb did not go! It did not separate from the aircraft! *Major Friedman had released the button!*

He completed his half loop, righting the aircraft at altitude. He was heading out toward open sea. Flack began to form around him. The Chinese knew he was there. He dived for low altitude.

He remained supersonic until well out over the waters again. Then he throttled back. He was numb for a while, appalled at what he had done. For a moment he became disoriented and pulled up frantically. But the vertigo passed quickly. He closed his eyes momentarily and bit hard on his lower lip.

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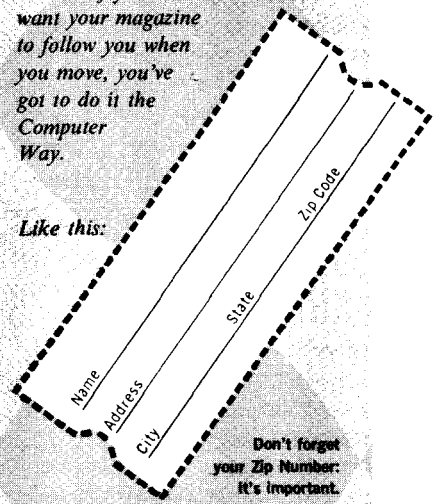

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The pain helped drive back the panic. Then, forcing his attention back to flying, he resumed his former altitude.

He thought of his situation for the first time since his bomb run. He tried to remember his thoughts at the precise moment of abort. But he couldn't think clearly. Self-condemnation was consuming him. Was this the end product of all his training, his dedication to the Service? He pulled off his oxygen mask and bit on gloved knuckles.

He would have to go back. He knew that. But it would be tougher now. And tougher still for some poor bastard who might have to follow. He groaned in anguish, then rolling the aircraft on its side and pulling on the stick, he turned back hard toward the target. The horizon was unbroken ahead of him, but he was on course again to Tientsin.

Then, suddenly, it was all clear.

He knew why he had aborted the run. *An earnest of intent* . . . the bomb was a message. Unlike any message sent previously in the history of man—desperate, hard, unequivocal—but a message nonetheless.

Major Friedman breathed deeply, holding the last breath a protracted time. Then he expelled it in a rush. It was like a great weight lifted from his chest.

The message would be delivered. But without a holocaust.

Part of it was delivered already. The Chinese had seen him. They fired at him. They knew his bomb run had been successful in all respects save one. It remained but to show that the abort was a matter of personal choice.

That responsibility was plainly his. It could only be so. Such a course as he intended could never have been ordered. Not in the United States. The Chinese would appreciate that fact.

He "safed" the weapon. This precluded nuclear yield. The bomb was impact-safe. He switched off the bombing computer and turned on the gun sight. A lighted reticle and crosshair sprang into view on the windscreen ahead of him. He ran the back of his hand gently over bruised lips. Strange, he thought, the panic was gone, completely gone. He hooked up the mask. It would be all right, now. Everything would be all right.

He edged the throttles forward slightly, increasing his airspeed to .95 Mach. The harbor was in sight again. He moved the aircraft until the *Cormorant* was centered in the gun sight reticle. Amidships, he decided, at the water line. There would be no nuclear detonation. But the Chinese would know of his bomb load, nonetheless, from the debris. The radioactive debris—

He whispered, "Hear O Israel, the Lord our God, the Lord is One." The *Cormorant* grew large in the gun sight.

"The Lord, He is . . ." ■

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VONDA N. MCINTYRE

All healers—
regardless of their tools
and techniques—
deal with the same factors:
life and death.

Of Mist, and Grass, and Sand

LEO SUMMERS

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The little boy was frightened. Gently, Snake touched his hot forehead. Behind her, three adults stood close together, watching, suspicious, afraid to show their concern with more than narrow lines around their eyes. They feared Snake as much as they feared their only child's death. In the dimness of the tent, the flickering lamplights gave no reassurance.

The child watched with eyes so dark the pupils were not visible, so dull that Snake herself feared for his life. She stroked his hair. It was long and very pale, a striking color against his dark skin, dry and irregular for several inches near the scalp. Had Snake been with these people months ago, she would have known the child was growing ill.

"Bring my case, please," Snake said.

The child's parents started at her soft voice. Perhaps they had expected the screech of a bright jay, or the hissing of a shining serpent. This was the first time Snake had spoken in their presence. She had only watched, when the three of them had come to observe her from a distance and whisper about her occupation and her youth; she had only listened, and then nodded, when finally they came to ask her help. Perhaps they had thought she was mute.

The fair-haired younger man lifted her leather case from the felt floor. He held the satchel away from his body, leaning to hand it to her, breathing shallowly with nostrils flared against the faint smell of musk in the dry desert air. Snake had almost accustomed herself to the kind of uneasiness he showed; she had already seen it often.

When Snake reached out, the young man jerked back and dropped the case. Snake lunged and barely caught it, set it gently down, and glanced at him with reproach. His husband and his wife came forward and touched him to ease his fear. "He was bitten once," the dark and handsome woman said. "He almost died." Her tone was not of apology, but of justification.

"I'm sorry," the younger man said. "It's—" He gestured toward her; he was trembling, and trying visibly to control the reactions of his fear. Snake glanced down, to her shoulder, where she had been unconsciously aware of the slight weight and movement. A tiny serpent, thin as the finger of a baby, slid himself around behind her neck to show his narrow head below her short black curls. He probed the air with his trident tongue, in a leisurely manner, out, up and down, in, to savor the taste of the smells.

"It's only Grass," Snake said. "He cannot harm you."

If he were bigger, he might frighten; his color was pale green, but the scales around his mouth were red, as if he had just feasted

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as a mammal eats, by tearing. He was, in fact, much neater.

The child whimpered. He cut off the sound of pain; perhaps he had been told that Snake, too, would be offended by crying. She only felt sorry that his people refused themselves such a simple way of easing fear. She turned from the adults, regretting their terror of her, but unwilling to spend the time it would take to convince them their reactions were unjustified. "It's all right," she said to the little boy. "Grass is smooth, and dry, and soft, and if I left him to guard you, even death could not reach your bedside." Grass poured himself into her narrow, dirty hand, and she extended him toward the child. "Gently." He reached out and touched the sleek scales with one fingertip. Snake could sense the effort of even such a simple motion, yet the boy almost smiled.

"What are you called?"

He looked quickly toward his parents, and finally they nodded. "Stavin," he whispered. He had no strength or breath for speaking.

"I am Snake, Stavin, and in a little while, in the morning, I must hurt you. You may feel a quick pain, and your body will ache for several days, but you will be better afterwards."

He stared at her solemnly. Snake saw that though he understood and feared what she might do, he was less afraid than if she had lied to him. The pain must have increased greatly as his illness became more apparent, but it seemed that others had only reassured him, and hoped the disease would disappear or kill him quickly.

Snake put Grass on the boy's pillow and pulled her case nearer. The lock opened at her touch. The adults still could only fear her; they had had neither time nor reason to discover any trust. The wife was old enough that they might never have another child, and Snake could tell by their eyes, their covert touching, their concern, that they loved this one very much. They must, to come to Snake in this country.

It was night, and cooling. Sluggish, Sand slid out of the case, moving his head, moving his tongue, smelling, tasting, detecting the warmth of bodies.

"Is that—?" The older husband's voice was low, and wise, but terrified, and Sand sensed the fear. He drew back into striking position, and sounded his rattle softly. Snake spoke to him and extended her arm. The pit viper relaxed and flowed around and around her slender wrist to form black and tan bracelets. "No," she said. "Your child is too ill for Sand to help. I know it is hard, but please try to be calm. This is a fearful thing for you, but it is all I can do."

She had to annoy Mist to make her come out. Snake rapped on the bag, and finally poked her twice. Snake felt the vibration of sliding

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scales, and suddenly the albino cobra flung herself into the tent. She moved quickly, yet there seemed to be no end to her. She reared back and up. Her breath rushed out in a hiss. Her head rose well over a meter above the floor. She flared her wide hood. Behind her, the adults gasped, as if physically assaulted by the gaze of the tan spectacle design on the back of Mist's hood. Snake ignored the people and spoke to the great cobra in a singsong voice. "Ah, thou. Furious creature. Lie down; 'tis time for thee to earn thy piglet. Speak to this child, and touch him. He is called Stavin." Slowly, Mist relaxed her hood, and allowed Snake to touch her. Snake grasped her firmly behind the head, and held her so she looked at Stavin. The cobra's silver eyes picked up the yellow of the lamplight. "Stavin," Snake said, "Mist will only meet you now. I promise that this time she will touch you gently."

Still, Stavin shivered when Mist touched his thin chest. Snake did not release the serpent's head, but allowed her body to slide against the boy's. The cobra was four times longer than Stavin was tall. She curved herself in stark white loops across Stavin's swollen abdomen, extending herself, forcing her head toward the boy's face, straining against Snake's hands. Mist met Stavin's frightened stare with the gaze of lidless eyes. Snake allowed her a little closer.

Mist flicked out her tongue to taste the child.

The younger husband made a small, cut-off, frightened sound. Stavin flinched at it, and Mist drew back, opening her mouth, exposing her fangs, audibly thrusting her breath through her throat. Snake sat back on her heels, letting out her own breath. Sometimes, in other places, the kinfolk could stay while she worked. "You must leave," she said gently. "It's dangerous to frighten Mist."

"I won't—"

"I'm sorry. You must wait outside."

Perhaps the younger husband, perhaps even the wife, would have made the indefensible objections and asked the answerable questions, but the older man turned them and took their hands and led them away.

"I need a small animal," Snake said as the man lifted the tent-flap. "It must have fur, and it must be alive."

"One will be found," he said, and the three parents went into the glowing night. Snake could hear their footsteps in the sand outside.

Snake supported Mist in her lap, and soothed her. The cobra wrapped herself around Snake's narrow waist, taking in her warmth. Hunger made her even more nervous than usual, and she was hungry, as was Snake. Coming across the black sand desert, they had found sufficient water, but Snake's

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traps were unsuccessful. The season was summer, the weather was hot, and many of the furry tidbits Sand and Mist preferred were estivating. When the serpents missed their regular meal, Snake began a fast as well.

She saw with regret that Stavin was more frightened now. "I am sorry to send your parents away," she said. "They can come back soon."

His eyes glistened, but he held back the tears. "They said to do what you told me."

"I would have you cry, if you are able," Snake said. "It isn't such a terrible thing." But Stavin seemed not to understand, and Snake did not press him; she knew that his people taught themselves to resist a difficult land by refusing to cry, refusing to mourn, refusing to laugh. They denied themselves grief, and allowed themselves little joy, but they survived.

Mist had calmed to sullenness. Snake unwrapped her from her waist and placed her on the pallet next to Stavin. As the cobra moved, Snake guided her head, feeling the tension of the striking muscles. "She will touch you with her tongue," she told Stavin. "It might tickle, but it will not hurt. She smells with it, as you do with your nose."

"With her tongue?"

Snake nodded, smiling, and Mist flicked out her tongue to caress Stavin's cheek. Stavin did not flinch; he watched, his child's delight in knowledge briefly overcoming pain. He lay perfectly still as Mist's long tongue brushed his cheeks, his eyes, his mouth. "She tastes the sickness," Snake said. Mist stopped fighting the restraint of her grasp, and drew back her head. Snake sat on her heels and released the cobra, who spiraled up her arm and laid herself across her shoulders.

"Go to sleep, Stavin," Snake said. "Try to trust me, and try not to fear the morning."

Stavin gazed at her for a few seconds, searching for truth in Snake's pale eyes. "Will Grass watch?"

The question startled her, or, rather, the acceptance behind the question. She brushed his hair from his forehead and smiled a smile that was tears just beneath the surface. "Of course." She picked Grass up. "Thou wilt watch this child, and guard him." The snake lay quiet in her hand, and his eyes glittered black. She laid him gently on Stavin's pillow.

"Now sleep."

Stavin closed his eyes, and the life seemed to flow out of him. The alteration was so great that Snake reached out to touch him, then saw that he was breathing, slowly, shallowly. She tucked a blanket around him and stood up. The abrupt change in position dizzied her; she staggered and caught her-

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self. Across her shoulders, Mist tensed.

Snake's eyes stung and her vision was over-sharp, fever-clear. The sound she imagined she heard swooped in closer. She steadied herself against hunger and exhaustion, bent slowly, and picked up the leather case. Mist touched her cheek with the tip of her tongue.

She pushed aside the tent-flap and felt relief that it was still night. She could stand the heat, but the brightness of the sun curled through her, burning. The moon must be full; though the clouds obscured everything, they diffused the light so the sky appeared gray from horizon to horizon. Beyond the tents, groups of formless shadows projected from the ground. Here, near the edge of the desert, enough water existed so clumps and patches of bush grew, providing shelter and sustenance for all manner of creatures. The black sand, which sparkled and blinded in the sunlight, at night was like a layer of soft soot. Snake stepped out of the tent, and the illusion of softness disappeared; her boots slid crunching into the sharp hard grains.

Stavin's family waited, sitting close together between the dark tents that clustered in a patch of sand from which the bushes had been ripped and burned. They looked at her silently, hoping with their eyes, showing no expression in their faces. A woman somewhat younger than Stavin's mother sat with them. She was dressed, as they were, in a long loose robe, but she wore the only adornment Snake had seen among these people: a leader's circle, hanging around her neck on a leather thong. She and the older husband were marked close kin by their similarities: sharp-cut planes of face, high cheekbones, his hair white and hers graying early from deep black, their eyes the dark brown best suited for survival in the sun. On the ground by their feet a small black animal jerked sporadically against a net, and infrequently gave a shrill weak cry.

"Stavin is asleep," Snake said. "Do not disturb him, but go to him if he wakes."

The wife and young husband rose and went inside, but the older man stopped before her. "Can you help him?"

"I hope we may. The tumor is advanced, but it seems solid." Her own voice sounded removed, slightly hollow, as if she were lying. "Mist will be ready in the morning." She still felt the need to give him reassurance, but she could think of none.

"My sister wished to speak with you," he said, and left them alone, without introduction, without elevating himself by saying that the tall woman was the leader of this group. Snake glanced back, but the tent flap fell shut. She was feeling her exhaustion more deeply, and across her shoulders Mist was, for

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the first time, a weight she thought heavy.

"Are you all right?"

Snake turned. The woman moved toward her with a natural elegance made slightly awkward by advanced pregnancy. Snake had to look up to meet her gaze. She had small fine lines at the corners of her eyes, as if she laughed, sometimes, in secret. She smiled, but with concern. "You seem very tired. Shall I have someone make you a bed?"

"Not now," Snake said, "not yet. I won't sleep until afterwards."

The leader searched her face, and Snake felt a kinship with her, in their shared responsibility.

"I understand, I think. Is there anything we can give you? Do you need aid with your preparations?"

Snake found herself having to deal with the questions as if they were complex problems. She turned them in her tired mind, examined them, dissected them, and finally grasped their meanings. "My pony needs food and water—"

"It is taken care of."

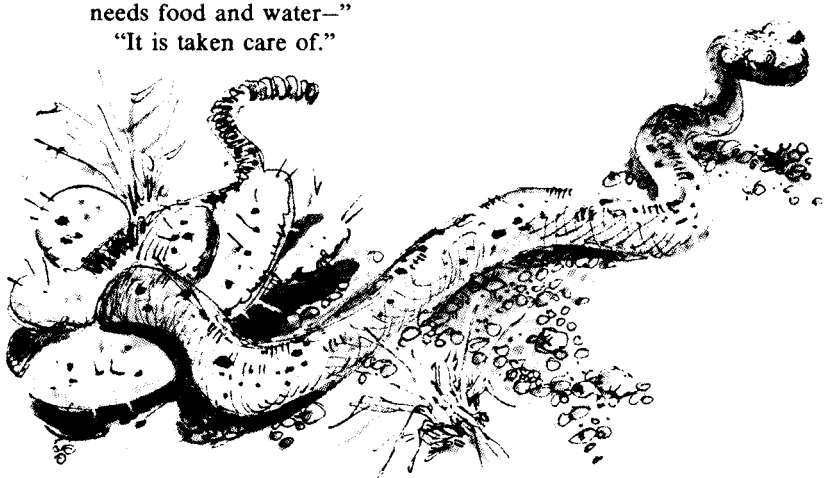
"And I need someone to help me with Mist. Someone strong. But it's more important that he is not afraid."

The leader nodded. "I would help you," she said, and smiled again, a little. "But I am a bit clumsy of late. I will find someone."

"Thank you."

Somber again, the older woman inclined her head and moved slowly toward a small group of tents. Snake watched her go, admiring her grace. She felt small and young and grubby in comparison.

Sand began to unwrap himself from her wrist. Feeling the anticipatory slide of scales on her skin, she caught him before he could drop to the ground. Sand lifted the upper half of his body from her hands. He flicked out his tongue, peering toward the little animal, feeling its body heat, smelling its fear. "I know thou art hungry," Snake said, "but that creature



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is not for thee." She put Sand in the case, lifted Mist from her shoulder, and let her coil herself in her dark compartment.

The small animal shrieked and struggled again when Snake's diffuse shadow passed over it. She bent and picked it up. The rapid series of terrified cries slowed and diminished and finally stopped as she stroked it. Finally it lay still, breathing hard, exhausted, staring up at her with yellow eyes. It had long hind legs and wide pointed ears, and its nose twitched at the serpent smell. Its soft black fur was marked off in skewed squares by the cords of the net.

"I am sorry to take your life," Snake told it. "But there will be no more fear, and I will not hurt you." She closed her hand gently around it, and, stroking it, grasped its spine at the base of its skull. She pulled, once, quickly. It seemed to struggle, briefly, but it was already dead. It convulsed; its legs drew up against its body, and its toes curled and quivered. It seemed to stare up at her, even now. She freed its body from the net.

Snake chose a small vial from her belt pouch, pried open the animal's clenched jaws, and let a single drop of the vial's cloudy preparation fall into its mouth. Quickly she opened the satchel again, and called Mist out. She came slowly, slipping over the edge, hood closed, sliding in the sharp-grained sand. Her milky scales caught the thin light. She smelled the animal, flowed to it, touched it with her tongue. For a moment Snake was afraid she would refuse dead meat, but the body was still warm, still twitching reflexively, and she was very hungry. "A tidbit for thee," Snake said. "To whet thy appetite." Mist nosed it, reared back, and struck, sinking her short fixed fangs into the tiny body, biting again, pumping out her store of poison. She released it, took a better grip, and began to work her jaws around it; it would hardly distend her throat. When Mist lay quiet, digesting the small meal, Snake sat beside her and held her, waiting.

She heard footsteps in the coarse sand.

"I'm sent to help you."

He was a young man, despite a scatter of white in his dark hair. He was taller than Snake, and not unattractive. His eyes were dark, and the sharp planes of his face were further hardened because his hair was pulled straight back and tied. His expression was neutral.

"Are you afraid?"

"I will do as you tell me."

Though his body was obscured by his robe, his long fine hands showed strength.

"Then hold her body, and don't let her surprise you." Mist was beginning to twitch from the effects of the drugs Snake had put in the

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small animal's body. The cobra's eyes stared, unseeing.

"If it bites—"

"Hold, quickly!"

The young man reached, but he had hesitated too long. Mist writhed, lashing out, striking him in the face with her tail. He staggered back, at least as surprised as hurt. Snake kept a close grip behind Mist's jaws, and struggled to catch the rest of her as well. Mist was no constrictor, but she was smooth and strong and fast. Thrashing, she forced out her breath in a long hiss. She would have bitten anything she could reach. As Snake fought with her, she managed to squeeze the poison glands and force out the last drops of venom. They hung from Mist's fangs for a moment, catching light as jewels would; the force of the serpent's convulsions flung them away into the darkness. Snake struggled with the cobra, speaking softly, aided for once by the sand, on which Mist could get no purchase. Snake felt the young man behind her, grabbing for Mist's body and tail. The seizure stopped abruptly, and Mist lay limp in their hands.

"I am sorry—"

"Hold her," Snake said. "We have the night to go."

During Mist's second convulsion, the young man held her firmly and was of some real help. Afterward, Snake answered his interrupted question. "If she were making poison and she bit you, you would probably die. Even now her bite would make you ill. But unless you do something foolish, if she manages to bite, she will bite me."

"You would benefit my cousin little, if you were dead or dying."

"You misunderstand. Mist cannot kill me." She held out her hand, so he could see the white scars of slashes and punctures. He stared at them, and looked into her eyes for a long moment, then looked away.

The bright spot in the clouds from which the light radiated moved westward in the sky; they held the cobra like a child. Snake found herself half-dozing, but Mist moved her head, dully attempting to evade restraint, and Snake woke herself abruptly. "I must not sleep," she said to the young man. "Talk to me. What are you called?"

As Stavin had, the young man hesitated. He seemed afraid of her, or of something. "My people," he said, "think it unwise to speak our names to strangers."

"If you consider me a witch you should not have asked my aid. I know no magic, and I claim none. I can't learn all the customs of all the people on this earth, so I keep my own. My custom is to address those I work with by name."

"It's not a superstition," he said. "Not as you might think. We're not afraid of being bewitched."

Snake waited, watching him, trying to decipher his expression in the dim light.

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"Our families know our names, and we exchange names with those we would marry."

Snake considered that custom, and thought it would fit badly on her. "No one else? Ever?"

"Well . . . a friend might know one's name."

"Ah," Snake said. "I see. I am still a stranger, and perhaps an enemy."

"A *friend* would know my name," the young man said again. "I would not offend you, but now you misunderstand. An acquaintance is not a friend. We value friendship highly."

"In this land one should be able to tell quickly if a person is worth calling 'friend'."

"We make friends seldom. Friendship is a commitment."

"It sounds like something to be feared."

He considered that possibility. "Perhaps it's the betrayal of friendship we fear. That is a very painful thing."

"Has anyone ever betrayed you?"

He glanced at her sharply, as if she had exceeded the limits of propriety. "No," he said, and his voice was as hard as his face. "No friend. I have no one I call friend."

His reaction startled Snake. "That's very sad," she said, and grew silent, trying to comprehend the deep stresses that could close people off so far, comparing her loneliness of necessity and theirs of choice. "Call me Snake," she said finally, "if you can bring yourself to pronounce it. Speaking my name binds you to nothing."

The young man seemed about to speak; perhaps he thought again that he had offended her, perhaps he felt he should further defend his customs. But Mist began to twist in their hands, and they had to hold her to keep her from injuring herself. The cobra was slender for her length, but powerful, and the convulsions she went through were more severe than any she had ever had before. She thrashed in Snake's grasp, and almost pulled away. She tried to spread her hood, but Snake held her too tightly. She opened her mouth and hissed, but no poison dripped from her fangs.

She wrapped her tail around the young man's waist. He began to pull her and turn, to extricate himself from her coils.

"She's not a constrictor," Snake said. "She won't hurt you. Leave her—"

But it was too late; Mist relaxed suddenly and the young man lost his balance. Mist whipped herself away and lashed figures in the sand. Snake wrestled with her alone while the young man tried to hold her, but she curled herself around Snake and used the grip for leverage. She started to pull herself from Snake's hands. Snake threw them both backward into the sand; Mist rose above her, open-mouthed, furious, hissing. The young man lunged and grabbed her

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just beneath her hood. Mist struck at him, but Snake, somehow, held her back. Together they deprived Mist of her hold, and regained control of her. Snake struggled up, but Mist suddenly went quite still and lay almost rigid between them. They were both sweating; the young man was pale under his tan, and even Snake was trembling.

"We have a little while to rest," Snake said. She glanced at him and noticed the dark line on his cheek where, earlier, Mist's tail had slashed him. She reached up and touched it. "You'll have a bruise, no more," she said. "It will not scar."

"If it were true that serpents sting with their tails, you would be restraining both the fangs and the stinger, and I'd be of little use."

"Tonight I'd need someone to keep me awake, whether or not he helped me with Mist." Fighting the cobra had produced adrenaline, but now it ebbed, and her exhaustion and hunger were returning, stronger.

"Snake . . ."

"Yes?"

He smiled, quickly, half-embarrassed. "I was trying the pronunciation."

"Good enough."

"How long did it take you to cross the desert?"

"Not very long. Too long. Six days."

"How did you live?"

"There is water. We traveled at night, except yesterday, when I could find no shade."

"You carried all your food?"

She shrugged. "A little." And wished he would not speak of food.

"What's on the other side?"

"More sand, more bush, a little more water. A few groups of people, traders, the station I grew up and took my training in. And farther on, a mountain with a city inside."

"I would like to see a city. Someday."

"The desert can be crossed."

He said nothing, but Snake's memories of leaving home were recent enough that she could imagine his thoughts.

The next set of convulsions came, much sooner than Snake had expected. By their severity, she gauged something of the stage of Stavin's illness, and wished it were morning. If she were to lose him, she would have it done, and grieve, and try to forget. The cobra would have battered herself to death against the sand if Snake and the young man had not been holding her. She suddenly went completely rigid, with her mouth clamped shut and her forked tongue dangling.

She stopped breathing.

"Hold her," Snake said. "Hold her head. Quickly, take her, and if she gets away, run. Take her! She won't strike at you now, she could only slash you by accident."

He hesitated only a moment, then grasped Mist behind the head.

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Snake ran, slipping in the deep sand, from the edge of the circle of tents to a place where bushes still grew. She broke off dry thorny branches that tore her scarred hands. Peripherally she noticed a mass of horned vipers, so ugly they seemed deformed, nesting beneath the clump of dessicated vegetation; they hissed at her: she ignored them. She found a narrow hollow stem and carried it back. Her hands bled from deep scratches.

Kneeling by Mist's head, she forced open the cobra's mouth and pushed the tube deep into her throat, through the air passage at the base of Mist's tongue. She bent close, took the tube in her mouth, and breathed gently into Mist's lungs.

She noticed: the young man's hands, holding the cobra as she had asked; his breathing, first a sharp gasp of surprise, then ragged; the sand scraping her elbows where she leaned; the cloying smell of the fluid seeping from Mist's fangs; her own dizziness, she thought from exhaustion, which she forced away by necessity and will.

Snake breathed, and breathed again, paused, and repeated, until Mist caught the rhythm and continued it unaided.

Snake sat back on her heels. "I think she'll be all right," she said. "I hope she will." She brushed the back of her hand across her forehead. The touch sparked pain: she jerked her hand down and agony slid along her bones, up her arm, across her shoulder, through her chest, enveloping her heart. Her balance turned on its edge. She fell, tried to catch herself but moved too slowly, fought nausea and vertigo and almost succeeded, until the pull of the earth seemed to slip away in pain and she was lost in darkness with nothing to take a bearing by.

She felt sand where it had scraped her cheek and her palms, but it was soft. "Snake, can I let go?" She thought the question must be for someone else, while at the same time she knew there was no one else to answer it, no one else to reply to her name. She felt hands on her, and they were gentle; she wanted to respond to them, but she was too tired. She needed sleep more, so she pushed them away. But they held her head and put dry leather to her lips and poured water into her throat. She coughed and choked and spat it out.

She pushed herself up on one elbow. As her sight cleared, she realized she was shaking. She felt as she had the first time she was snake-bit, before her immunities had completely developed. The young man knelt over her, his water flask in his hand. Mist, beyond him, crawled toward the darkness. Snake forgot the throbbing pain. "Mist!"

The young man flinched and turned, frightened; the serpent

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reared up, her head nearly at Snake's standing eye level, her hood spread, swaying, watching, angry, ready to strike. She formed a wavering white line against black. Snake forced herself to rise, feeling as though she were fumbling with the control of some unfamiliar body. She almost fell again, but held herself steady. "Thou must not go to hunt now," she said. "There is work for thee to do." She held out her right hand, to the side, a decoy, to draw Mist if she struck. Her hand was heavy with pain. Snake feared, not being bitten, but the loss of the contents of Mist's poison sacs. "Come here," she said. "Come here, and stay thy anger." She noticed blood flowing down between her fingers, and the fear she felt for Stavin was intensified. "Didst thou bite me, creature?" But the pain was wrong: poison would numb her, and the new serum only sting . . .

"No," the young man whispered, from behind her.

Mist struck. The reflexes of long training took over. Snake's right hand jerked away, her left grabbed Mist as she brought her head back. The cobra writhed a moment, and relaxed. "Devious beast," Snake said. "For shame." She turned, and let Mist crawl up her arm and over her shoulder, where she lay like the outline of an invisible cape and dragged her tail like the edge of a train.

"She did not bite me?"

"No," the young man said. His contained voice was touched with awe. "You should be dying. You should be curled around the agony, and your arm swollen purple. When you came back—" He gestured toward her hand. "It must have been a bush viper."

Snake remembered the coil of reptiles beneath the branches, and touched the blood on her hand. She wiped it away, revealing the double puncture of a snakebite among the scratches of the thorns. The wound was slightly swollen. "It needs cleaning," she said. "I shame myself by falling to it." The pain of it washed in gentle waves up her arm, burning no longer. She stood looking at the young man, looking around her, watching the landscape shift and change as her tired eyes tried to cope with the low light of setting moon and false dawn. "You held Mist well, and bravely," she said to the young man. "Thank you."

He lowered his gaze, almost bowing to her. He rose, and approached her. Snake put her hand gently on Mist's neck so she would not be alarmed.

"I would be honored," the young man said, "if you would call me Arevin."

"I would be pleased to."

Snake knelt down and held the winding white loops as Mist crawled slowly into her compartment. In a little while, when Mist had stabilized, by dawn, they could go to Stavin.

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The tip of Mist's white tail slid out of sight. Snake closed the case and would have risen, but she could not stand. She had not yet quite shaken off the effects of the new venom. The flesh around the wound was red and tender, but the hemorrhaging would not spread. She stayed where she was, slumped, staring at her hand, creeping slowly in her mind toward what she needed to do, this time for herself.

"Let me help you. Please."

He touched her shoulder and helped her stand. "I'm sorry," she said. "I'm so in need of rest . . ."

"Let me wash your hand," Arevin said. "And then you can sleep. Tell me when to waken you—"

"No. I can't sleep yet." She pulled together the skeins of her nerves, collected herself, straightened, tossed the damp curls of her short hair off her forehead. "I'm all right now. Have you any water?"

Arevin loosened his outer robe. Beneath it he wore a loincloth and a leather belt that carried several leather flasks and pouches. The color of his skin was slightly lighter than the sun-darkened brown of his face. He brought out his water flask, closed his robe around his lean body, and reached for Snake's hand.

"No, Arevin. If the poison gets in any small scratch you might have, it could infect."

She sat down and sluiced lukewarm water over her hand. The water dripped pink to the ground and disappeared, leaving not even a damp spot visible. The wound bled a little more, but now it only ached. The poison was almost inactivated.

"I don't understand," Arevin said, "how it is that you're unhurt. My younger sister was bitten by a bush viper." He could not speak as uncaringly as he might have wished. "We could do nothing to save her—nothing we had would even lessen her pain."

Snake gave him his flask and rubbed salve from a vial in her belt pouch across the closing punctures. "It's a part of our preparation," she said. "We work with many kinds of serpents, so we must be immune to as many as possible." She shrugged. "The process is tedious and somewhat painful." She clenched her fist; the film held, and she was steady. She leaned toward Arevin and touched his abraded cheek again. "Yes . . ." She spread a thin layer of the salve across it. "That will help it heal."

"If you cannot sleep," Arevin said, "can you at least rest?"

"Yes," she said. "For a little while."

Snake sat next to Arevin, leaning against him, and they watched the sun turn the clouds to gold and flame and amber. The simple physical contact with another human being gave Snake pleasure, though she found it unsatisfying. Another time, another place, she might do

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something more, but not here, not now.

When the lower edge of the sun's bright smear rose above the horizon, Snake rose and teased Mist out of the case. She came slowly, weakly, and crawled across Snake's shoulders. Snake picked up the satchel, and she and Arevin walked together back to the small group of tents.

Stavin's parents waited, watching for her, just outside the entrance of their tent. They stood in a tight, defensive, silent group. For a moment Snake thought they had decided to send her away. Then, with regret and fear like hot iron in her mouth, she asked if Stavin had died. They shook their heads, and allowed her to enter.

Stavin lay as she had left him, still asleep. The adults followed her with their stares, and she could smell fear. Mist flicked out her tongue, growing nervous from the implied danger.

"I know you would stay," Snake said. "I know you would help, if you could, but there is nothing to be done by any person but me. Please go back outside."

They glanced at each other, and at Arevin, and she thought for a moment that they would refuse. Snake wanted to fall into the silence and sleep. "Come, cousins," Arevin said. "We are in her hands." He opened the tent flap and motioned them out. Snake thanked him with nothing more than a glance, and he might almost have smiled. She turned toward Stavin, and knelt beside him. "Stavin—" She touched his forehead; it was very hot. She noticed that her hand was less steady than before. The slight touch awakened the child. "It's time," Snake said.

He blinked, coming out of some child's dream, seeing her, slowly recognizing her. He did not look frightened. For that Snake was glad; for some other reason she could not identify she was uneasy.

"Will it hurt?"

"Does it hurt now?"

He hesitated, looked away, looked back. "Yes."

"It might hurt a little more. I hope not. Are you ready?"

"Can Grass stay?"

"Of course," she said.

And realized what was wrong.

"I'll come back in a moment." Her voice changed so much, she had pulled it so tight, that she could not help but frighten him. She left the tent, walking slowly, calmly, restraining herself. Outside, the parents told her by their faces what they feared.

"Where is Grass?" Arevin, his back to her, started at her tone. The younger husband made a small grieving sound, and could look at her no longer.

"We were afraid," the older husband said. "We thought it would bite the child."

"I thought it would. It was I. It

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crawled over his face, I could see its fangs—" The wife put her hands on the younger husband's shoulders, and he said no more.

"Where is he?" She wanted to scream; she did not.

They brought her a small open box. Snake took it, and looked inside.

Grass lay cut almost in two, his entrails oozing from his body, half turned over, and as she watched, shaking, he writhed once, and flicked his tongue out once, and in. Snake made some sound, too low in her throat to be a cry. She hoped his motions were only reflex, but she picked him up as gently as she could. She leaned down and touched her lips to the smooth green scales behind his head. She bit him quickly, sharply, at the base of the skull. His blood flowed cool and salty in her mouth. If he were not dead, she had killed him instantly.

She looked at the parents, and at Arevin; they were all pale, but she had no sympathy for their fear, and cared nothing for shared grief. "Such a small creature," she said. "Such a small creature, who could only give pleasure and dreams." She watched them for a moment more, then turned toward the tent again.

"Wait—" She heard the older husband move up close behind her. He touched her shoulder; she shrugged away his hand. "We will give you anything you want," he

said, "but leave the child alone."

She spun on him in a fury. "Should I kill Stavin for your stupidity?" He seemed about to try to hold her back. She jammed her shoulder hard into his stomach, and flung herself past the tent flap. Inside, she kicked over the satchel. Abruptly awakened, and angry, Sand crawled out and coiled himself. When the younger husband and the wife tried to enter, Sand hissed and rattled with a violence Snake had never heard him use before. She did not even bother to look behind her. She ducked her head and wiped her tears on her sleeve before Stavin could see them. She knelt beside him.

"What's the matter?" He could not help but hear the voices outside the tent, and the running.

"Nothing, Stavin," Snake said. "Did you know we came across the desert?"

"No," he said, with wonder.

"It was very hot, and none of us had anything to eat. Grass is hunting now. He was very hungry. Will

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you forgive him and let me begin? I will be here all the time."

He seemed so tired; he was disappointed, but he had no strength for arguing. "All right." His voice rustled like sand slipping through the fingers.

Snake lifted Mist from her shoulders, and pulled the blanket from Stavin's small body. The tumor pressed up beneath his rib cage, distorting his form, squeezing his vital organs, sucking nourishment from him for its own growth. Holding Mist's head, Snake let her flow across him, touching and tasting him. She had to restrain the cobra to keep her from striking; the excitement had agitated her. When Sand used his rattle, she flinched. Snake spoke to her softly, soothing her; trained and bred-in responses began to return, overcoming the natural instincts. Mist paused when her tongue flicked the skin above the tumor, and Snake released her.

The cobra reared, and struck, and bit as cobras bite, sinking her fangs their short length once, releasing, instantly biting again for a better purchase, holding on, chewing at her prey. Stavin cried out, but he did not move against Snake's restraining hands.

Mist expended the contents of her venom sacs into the child, and released him. She reared up, peered around, folded her hood, and slid across the mats in a perfectly straight line toward her dark, close compartment.

"It is all finished, Stavin."

"Will I die now?"

"No," Snake said. "Not now. Not for many years, I hope." She took a vial of powder from her belt pouch. "Open your mouth." He complied, and she sprinkled the powder across his tongue. "That will help the ache." She spread a pad of cloth across the series of shallow puncture wounds, without wiping off the blood.

She turned from him.

"Snake? Are you going away?"

"I will not leave without saying good-bye. I promise."

The child lay back, closed his eyes, and let the drug take him.

Sand coiled quiescently on the dark matting. Snake called him. He moved toward her, and suffered himself to be replaced in the satchel. Snake closed it, and lifted it, and it still felt empty. She heard noises outside the tent. Stavin's parents and the people who had come to help them pulled open the tent flap and peered inside, thrusting sticks in even before they looked.

Snake set down her leather case. "It's done."

They entered. Arevin was with them too; only he was empty-handed. "Snake—" He spoke through grief, pity, confusion, and Snake could not tell what he believed. He looked back. Stavin's mother was just behind him. He took her by the shoulder. "He would have died without her.

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Whatever has happened now, he would have died."

The woman shook his hand away. "He might have lived. It might have gone away. We—" She could not speak for hiding tears.

Snake felt the people moving, surrounding her. Arevin took one step toward her and stopped, and she could see he wanted her to defend herself. "Can any of you cry?" she said. "Can any of you cry for me and my despair, or for them and their guilt, or for small things and their pain?" She felt tears slip down her cheeks.

They did not understand her; they were offended by her crying. They stood back, still afraid of her, but gathering themselves. She no longer needed the pose of calmness she had used to deceive the child. "Ah, you fools." Her voice sounded brittle. "Stavin—"

Light from the entrance struck them. "Let me pass." The people in front of Snake moved aside for their leader. She stopped in front of Snake, ignoring the satchel her foot almost touched. "Will Stavin live?" Her voice was quiet, calm, gentle.

"I cannot be certain," Snake said, "but I feel that he will."

"Leave us." The people understood Snake's words before they did their leader's; they looked around and lowered their weapons, and finally, one by one, they moved out of the tent. Arevin remained. Snake felt the strength that came from danger seeping from her. Her knees collapsed. She bent over the satchel with her face in her hands. The older woman knelt in front of her, before Snake could notice or prevent her. "Thank you," she said. "Thank you. I am so sorry . . ." She put her arms around Snake, and drew her toward her, and Arevin knelt beside them, and he embraced Snake too. Snake began to tremble again, and they held her while she cried.

Later she slept, exhausted, alone in the tent with Stavin, holding his hand. They had given her food, and small animals for Sand and Mist, and supplies for her journey, and sufficient water for her to bathe, though that must have strained their resources. About that, Snake no longer cared.

When she awakened, she felt the tumor, and found that it had begun to dissolve and shrivel, dying, as Mist's changed poison affected it. Snake felt little joy. She smoothed Stavin's pale hair back from his face. "I would not lie to you again, little one," she said, "but I must leave soon. I cannot stay here." She wanted another three days' sleep, to finish fighting off the effects of the bush viper's poison, but she would sleep somewhere else. "Stavin?"

He half woke, slowly. "It doesn't hurt any more," he said.

"I am glad."

"Thank you . . ."

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"Good-bye, Stavin. Will you remember later on that you woke up, and that I did stay to say good-bye?"

"Good-bye," he said, drifting off again. "Good-bye, Snake. Good-bye, Grass." He closed his eyes, and Snake picked up the satchel and left the tent. Dusk cast long indistinct shadows; the camp was quiet. She found her tiger-striped pony, tethered with food and water. New, full water-skins lay on the ground next to the saddle. The tiger pony whickered at her when she approached. She scratched his striped ears, saddled him, and strapped the case on his back. Leading him, she started west, the way she had come.

"Snake—"

She took a breath, and turned back to Arevin. He faced the sun, and it turned his skin ruddy and his robe scarlet. His streaked hair flowed loose to his shoulders, gentling his face. "You will not stay?"

"I cannot."

"I had hoped . . ."

"If things were different, I might have stayed."

"They were frightened. Can't you forgive them?"

"I can't face their guilt. What they did was my fault. I said he could not hurt them, but they saw his fangs and they didn't know his bite only gave dreams and eased dying. They couldn't know; I didn't understand them until too late."

"You said it yourself, you can't know all the customs and all the fears."

"I'm crippled," she said. "Without Grass, if I cannot heal a person, I cannot help at all. I must go home. Perhaps my teachers will forgive me my stupidity, but I am afraid to face them. They seldom give the name I bear, but they gave it to me, and they'll be disappointed."

"Let me come with you."

She wanted to; she hesitated, and cursed herself for that weakness. "They may cast me out, and you would be cast out too. Stay here, Arevin."

"It wouldn't matter."

"It would. After a while, we would hate each other. I don't know you, and you don't know me. We need calmness, and quiet, and time to understand each other."

He came toward her, and put his arms around her, and they stood together for a moment. When he raised his head, he was crying. "Please come back," he said. "Whatever happens, please come back."

"I will try," Snake said. "Next spring, when the winds stop, look for me. And the spring after that, if I do not come, forget me. Wherever I am, if I live, I will forget you."

"I will look for you," Arevin said, and he would promise no more.

Snake picked up the pony's lead, and started across the desert. ■

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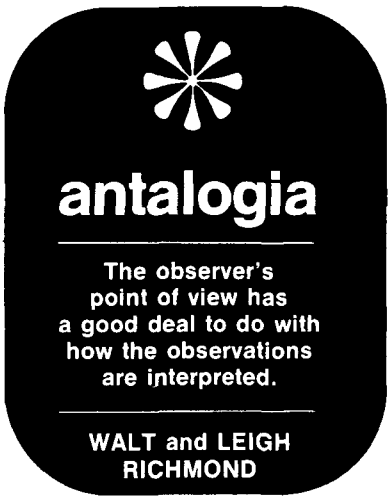
The Incredible Being, one of the crew of the spaceship, lay stretched full-length on the biosynthetic carpet, exposing itself to the only slightly shielded radiation from the great hydrogen reactor which supplied the ship's power.

There was no tremor in the deck beneath the Being, although he could hear the nearby pounding of the ship's major hydraulic life-support system, kept constantly in motion by the aerodynamic coupling of its gravito/dynamic pumping system to the higher energies of its gaseous heat energy conversion system.



This was the second largest of the four major interdependent and interacting life-support systems that maintained the ship in a complex that had long since been refined into the dynamic stability of a self-repairing configuration, leaving the crew unhampered by necessity for attention to any but the most superficial detail, their intelligence free to direct the goals of the voyage.

The carpet beneath the Being, designed for pleasure as well as comfort, and a small part of the third largest life-support system, gave off a pleasing odor as it renewed itself in a feedback between the radiation of the hydrogen reactor, and the fluids in the tiny hydraulic network of tubes interlacing its nap; while at the same time it absorbed excessive quantities of gases escaping other units, refining the molecular content of the gases into a structure that would tend to rebalance the pneumatic system, largest of the four.

The crew member's attention was focused on one unit of the millions of one form of tiny biorobots that were busily cleaning the deck of the specific type of scraps and crumbs for which they were programmed. It was the robot's size that was so fascinating. Its entire body length was less than 1/400th of that of the crew member observing it, yet it seemed incredibly strong, manipulating a mass several times its own volume and slowly dragging it across the deck toward its particular disposal chute. Once in the chute, the Being knew, the mass would be tackled by a number of similar robots, dissected, and put through a complicated process

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from which it would emerge in a different chemical form, ready to resume its place in the manufacturing of other structures.

Though he observed but one unit of one form of the ship's microservicing units, the Being was easily aware of the millions of different robot types of varying size and complexity, from microscopic to macroscopic, that performed the ship's many automated servicing functions. He was too new a crew member to understand the actual complexity of the self-maintaining and self-servicing ship he was aboard, or of the vast regulatory equipment that kept it in a dynamic stability. Since the technology of the ship itself had long since been established, it was doubtful if any of the full technicians who acted as the supervisors of the crew actually understood the full detail of its functioning or were even completely aware of the intricacy of the configuration they had come to take for granted.

But the microrobot the Being was watching was a subject, he decided, that he would go into in more detail. Occasionally the balance between usefulness and numbers in this particular robot got out of kilter, and although the feedback systems normally operated almost at once to restore the balance, his immediate superior had remarked that morning that this particular robot was in oversupply in their area, and measures would need to be taken to cut back the supply-to-demand proportion.

The measures proposed for the cutback seemed to the Being to be excessive, but that problem was outside of his competence and he confined his attention to a need to know more about the delicacies of the minute creature whose quick and graceful motions seemed so efficient; whose feelers appeared to give it so complete a concept of the microproblem it was engaged in; and whose tensil strength must be great if one compared the lift and motive power in moving the mass to the size of the manipulating waldos.

These robots were not among the subjects the crew member had been instructed to study in detail; they had simply caught his interest in a period of relaxation.

Suddenly the Incredible Being was jerked from his reverie of associative thinking as he became aware of a communication from his immediate superior.

"Andy, get away from that anthill and come on over here to the beach where I can keep an eye on you."

The young boy rose from his stretched, full-length position on the carpet of grass and ran toward the beach where the Moon-pulled tide was coming in and the wind-blown waves pounded the sand, working over the Earth's content of recyclable life materials. ■

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JACK GAUGHAN

KEVIN O'DONNELL, Jr.

Having psionic talent is one thing; knowing how to use it is something entirely different!

The Hand Is Quicker

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My series of somersaults was ending. With practiced ease I slapped my feet down and leaned backwards just a bit so I wouldn't fall flat on my face. Then I did the same with the other me, and slipped us both back to my body so I could see through eyes again. My hearing snapped back quickly, and I could tell from the murmur of the other bettors that I'd made my point. My eyes focused just in time to see a hand—large, suntanned, callused, and somehow competent-looking—scoop the dice up.

"Harry, check these," I heard a graveled voice say. The hand with the dice swung a few inches through the air and opened over another hand, this one pale and slender, with long and delicate fingers that reminded me of a piano player I once knew. The dice dropped and I knew that I could be in a lot of trouble very soon.

I let my eyesight wander up from the dark hand to the rumbling voice. I studied the curly black hair on the back of the hand, the starched cuff of the astonishingly white shirt, the smooth silk of the black tuxedo, and the bulge at the shoulder that suggested I had best be quiet and well-mannered to this individual. Then I looked at the face. As bronzed as the hand that had taken my dice, it was flat, wrinkle-free, and—if you allow me to ignore the polite smile that everyone knew was there only for show—icily expressionless.

"Sir?" I asked inquiringly.

"We would like to speak to you for a moment, Mr.—?" The voice was quiet, and as polite as the smile, but a dual air of authority and menace hung behind its soft words.

"Mr. Jones," I offered helpfully. "Mr. Irving Tecumseh Jones." I paused for a moment and became aware of the others pressed against the table. Many were curious, a few were concerned—but all were relieved that I was being removed. I smiled sadly and agreed it would be convenient to speak to him.

We stepped away from the table and I heard the now empty dice clatter their unguided way across the green felt. We said nothing to each other as we moved slowly through the crowded casino; there really was nothing to be said.

His office was quiet after the dull roar of the gaming rooms; the air was fresher, though it still smacked of the machines that had processed it. My husky guide waved me into a soft leather chair, and moved around the broad mahogany desk to his own seat. During the short silence that followed, I glanced around the room. There were several nice paintings that I perhaps unjustly assumed to have safes behind them, and quite a few long bookcases stuffed with fat works on statistics and probability theory. The rest of the office was done in soft pastels and natural wood, a decoration scheme so carefully

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planned that it was difficult to notice the room had no windows. Or it would have been difficult, were I not feeling so ensnared.

The manager broke the silence at last. "Mr. Jones," he began in a confident voice, "our table man tells us that he thinks there's something a bit unusual about your—ah—performance with the dice. I'd like to ask you some questions."

"What is this?" I demanded, trying to throw him off balance. "I mean—"

"Please, Mr. Jones. First, how much have you won tonight?"

"Ten thousand dollars, but—"

"Ten thousand dollars. I see." He sounded like a jury foreman pronouncing the word "guilty."

"Now wait one minute," I protested. "That was pure luck. I won that money—"

"Mr. Jones, if our table man is correct—and he usually is—you have neither lost more than twenty dollars nor won less than a hundred dollars on any single throw."

I felt sick. I'd been afraid that they'd notice me if I just kept winning, so I'd made sure to lose frequently; however, I couldn't bring myself to throw away too much of that good green stuff. I'd tried to disguise it by continually changing the intervals and amounts, but they'd found out after all. Shit. "So what the hell does that have to do with anything except my luck?"

"Mr. Jones, it makes us very suspicious when something like that happens. The odds, you see, are highly against it." He waved his hand at the shelves of math books and leaned back in his chair. "So, Mr. Jones, we're trying to find out how you did it. Unless you'd care to tell us, and save us all that trouble?" He raised his eyebrows in query. I shook my head. He shrugged, and pressed a button on the chrome panel inserted into his desk. A muted chime sounded, and immediately a respectful voice answered: "Yes, sir?"

"Harry, what was the matter with those dice?"

"Nothing, sir."

The big man's expression became considerably less serene as he leaned forward slightly in his chair. "What do you mean, 'nothing'?"

"What I said, sir. There is nothing wrong with the dice. They are the casino's own issue, and they have not been tampered with. We have been rolling them ever since you picked them up, and we are getting only the standard, expected series."

"Harry, there's gotta be *some*thing wrong with 'em." I smiled discreetly at the note of frustration in his voice.

"Sir, we just reached the 360th roll. Everything seems normal. The dice are fine." The flunky's voice was cool, tinged with a noticeable streak of triumph.

"All right. Thanks anyway." He lifted his finger from the button it had been depressing, and raised his

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face to me. His expression was still polite, but the cold glitter deep within his eyes warned me to press my advantage no further.

"Mr. Jones," he said at length, "our technical department says you were using honest dice. Their implicit conclusion was that you won honestly. Mr. Jones, I do not—I cannot—agree with that conclusion. I've been shooting craps, and running crap games, since I started grade school, and I can recognize a cheater when I see one in action." He put both hands flat on the desktop and bent forward some more, as if daring me to deny his accusation. I thought I might as well give it a try.

"But if the dice—"

"Damn it!" he exploded. "I don't give a damn about the dice. So *they're* honest—then you have some kind of illegal throw or something. But you shouldn't have been able to win that much money the way you won it. I don't like it, Jones, I don't like it at all!" He paused to rein in his temper, and then stood up. "Mr. Jones, I'm going to have to ask you to leave this casino. I don't know how you're cheating, but you are, and we can't afford to have your kind around here. So—pick up what you've won at the cashier's window, then get out."

I had slipped out of the easy chair and turned for the door when he spoke again. "Mr. Jones."

I looked over my shoulder at him. "Yes?"

"I'm calling the other casino managers to warn them about you—you'll never be allowed in any casino here in Vegas again, not if I have anything to say about it."

"Thanks loads," I grunted, and made my way to the money office.

I cursed myself thoroughly as I walked through the crowded casino. Here I'd had the perfect life within reach—all play for pay and no work at all—and because I'd wanted to get it a little quicker than I knew was safe I'd gotten caught. And now the good life was being taken away from me. Idiot! All that talent and no place to use it. Fool!

As I recall, my talent—my telekinetic ability—started to show itself shortly after I hit puberty. What a mess *that* made of me. It's bad enough to go through the normal miseries of acne and voice change and unfulfillable sex drive, but to have something like this that I had to keep hidden from everyone—it's lucky I didn't suicide out around age sixteen. I guess I was a little luckier than I could have been, though—I'd been a sci-fi reader since I was ten, and I knew that I had to keep quiet about what I could do. I shudder every time I think what it would have been like if the Defense Department—or worse yet, some crazy university professor—had learned about my power and had requisitioned me.

No, I'd been cagey. I'd stayed shut up in my room, trying to de-

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velop my talent as best I could. I'd found out a lot about it too, for a kid who was teaching himself. I could use it in either of two ways: as if I had another body that I could remote control, or as if I were within the object I was TK-ing. The only limitations that I discovered were that I had to be in sight of what I was working on, and that I couldn't do with TK what I couldn't do with my real body—I mean, I could make an ashtray seem to fly across the room, all right, but I was only "picking it up" with my invisible body and carrying it. If I got inside that ashtray, about all I could do would be to rock it, to tilt "my" weight first this way, then that. That's what I'd been doing with the dice—I'd gotten inside them and shifted my weight so that I landed right side up—or, rather, so that the dice landed right side up.

That was a trick I learned in the Army. You see, I'd never been terribly intelligent—at least by the usual academic standards—and when I started into adolescence, my grades went to hell. Next thing I knew, I was being drafted. I went. After all, I'd figured at the time, what the hell? I mean, I had nothing else to do. So I spent two years fighting for Uncle Sam in the jungles of South Vietnam. That changed my life—and I don't mean war and killing and all that; that's pretty much part of everyone's life, in some way or another. What I mean is that in the barracks, when you're just sitting around with nothing much to do except not think about the next patrol, you shoot craps. So I shot craps. I played regularly for eight months before my stupidity hit me; I suddenly realized that I could use my talent on the dice and clean up. So I did. Took me about six months, too, to learn how to handle the damn things not only well enough, but also inconspicuously enough, to be able to win and then collect my winnings. That's why I signed up for another tour in Nam—combat infantrymen gamble higher than anybody, except maybe Marines. I left Nam and the Army on the same day, fifteen thousand dollars richer than when I went in. Then I went to Vegas and got caught my first night in town. Shit!

I collected my winnings and went out into the night.

It was dark outside, even with all the neon lights glowing, and I stood by the casino entrance for a minute or two, trying to let my eyes adjust and also trying to decide what to do now. A twenty-five-thousand-dollar bank roll was nice, but it would hardly support me, not in the style to which I desperately wanted to become accustomed nor for the length of time I had planned. If the other casinos wouldn't accept me, then there was no point in staying in town; on the other hand, if they would, it was

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pointless to leave. I finally decided I might as well try them all, one by one, and was about to walk to the one a block away when a strong hand grasped me, a lot less firmly than it might have, on the right arm above the elbow.

"Jones?" I heard. "Let's us have a little talk."

I was about to slap the hand away when I got a good look at its owner. The guy was very big and very black—two attributes which, separately, put me at a disadvantage; together, they're a badge of irresistible power and authority.

I mumbled something. The hand tugged meaningfully at my arm; I nodded and followed. We went around a corner, then around another; after going through an alley or three I was completely lost. We stopped, finally, in a studio apartment on the third floor of a building which looked older than it could possibly be. I slumped into a rusty lawn chair facing a new Sony portable TV and caught my breath.

The black man stood in front of me, scrutinizing me carefully. At last he smiled slightly. "You'll do jus' fine," he said, and disappeared around the corner of a tall bookcase. I heard a refrigerator snicker and glass clink. A moment later he was back with a bottle of beer in each hand. He set mine on the rickety table to my right, and dropped easily onto a torn couch on the other side of it. I hitched my chair around to face him.

"O.K., Jones," he began, "I'm gonna start by showing all my cards right off. I know 'zactly what you can do—I know jus' how you won that money tonight."

Tension ran tiny prickles down my back. "I'm afraid I really don't understand you, Mr.—?"

"Coy," he grunted, "jus' plain ole Coy." He paused. "Now, look—I don't wanna play no run-around games with you, Jones, so listen to me first, *then* argue, O.K.?"

I shrugged, but said nothing.

"Good. Now, I am what you call a *'sen*-sitive'. That is, when someone's using some kind of power that most people don't have and don't know about, a *sen*-sitive can feel it being used. Like dawgs, you know? The way those little mothers can hear a really high whistle? Well, I can do the same thing when one par-ticular power's being used. The same par-ticular power that you were using on them dice earlier this *even*ing." He took a swig from his beer and smiled.

"Listen, Coy, I—"

"You not trying to kid me, now, are you, Jones?" Blue-green light, pumped from a nearby neon sign, flowed across his rich brown face, imbuing his smile with an air of malice that I didn't like.

"Coy, really, I—"

His voice went very, very cold. "Jones, I was standing next to that crap table all night long, just watching you pick up your money in little bits and pieces. I felt your

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mind moving, Jones—I felt you crawl inside them dice and make 'em jump the way you wanted. Don't tell me no different, 'cause if you do, why, I'll know you lying to me, boy, and I get mad when people lie to me."

I was cowed. "All right, Coy, all right." I lit a cigarette, sipped at my beer, and fought the crawlies inside me. "Yeah," I said, letting the smoke out in one big rush, "that's how I won. So?"

Coy relaxed and smiled again. "Good man. Nice to hear you fess up. Now we can start talking." He hunched forward across the table and spun the ashtray idly with his strong, arrogant fingers. "Now, the way I figure, Jones, you still need money. Right?" He glanced up, sympathetic amusement lighting his eyes.

"Yeah."

"Good. Man at the casino tell you you ain't gonna be allowed in no Vegas casinos at all anymore?"

"Yeah."

"Truth. You are barred—or, will be, once he gets off that phone."

"Yeah, yeah, I know!" I said impatiently. "But what the—"

He held up a large hand and lazily waved me into silence. "No sweat, Jones. Coy's got a way for you to use your power and make some coin at the same time."

"How?"

"Simple, my good man," he said expansively, "simple. Near to this very room is a big-time drug pusher—nope, that's the wrong word for him. He used to be a stand-on-the-corner,sell-you-a-nickel-bag man, back when we two was on speaking terms; but a thorough application of the traditional American virtues of industry and competitiveness, plus three business courses at night school, plus a gang of goons, so ugly that strong men are unable to look at 'em, who ran off the other pushers—all combined to make this dude the kingpin of the drug business in downtown Vegas. That man is now so high up, though, he ain't seen any junk in years; he's so rich that just thumbing through them thousand-dollar bills gets his fingers black as mine."

I was intrigued. Hooked, in fact. But I tried not to let my interest show as I stubbed out my cigarette and said, "So get to the point."

"Well, the point about this dude is, he got a problem. A big problem. Too much cash money. If he goes putting it in the bank, why, the man from the Tax Department, he gonna come 'round and ask, 'Son, where all that money come from?' And then our boy, he's in real trouble. So—he keeps it in a shoe box, under his bed. When he gets the shoe box filled up, he takes a little trip to someplace—say, Switzerland?—where he can deposit that money without getting his ass harassed."

"O.K., O.K.—so?"

"So, Jones, that box's just about

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full to the top now with crinkly little thousand-dollar bills."

"Are you saying you want me to help you *rob* him, Coy?"

"Why, sure enough, brother."

We sat tensely still for a very long moment, staring at each other, measuring each other. Coy breathed deeply, evenly, the four-inch points on his collar rising up and down as his great brown chest filled and emptied. I don't believe I breathed at all. I was thinking too hard.

How much money could a shoe box hold, if it held only thousand-dollar bills? I tried to visualize that many green, oval portraits of one man and failed. A lot. Half of it could certainly keep me going for a long, long time—say, spend twenty of them a year, and twenty bills'd make a stack just about *that* high, and half a shoe box looks like it'd be about this high, and . . . damn!

Dangerous, though . . . I didn't like the sound of 'goons'—sounded mean and vicious and almost efficient . . . bastards wouldn't hesitate, they'd shoot me right off, no second thoughts about pain or anything, like dogs, that's all . . . wouldn't want to get in their way. I hoped Coy had some kind of good plan that would keep me as far away from them as possible.

Coy—could I trust him? Shit, I didn't know about doing something like this with a ni—a black man, even if some of the best guys back in Nam were black . . . yeah, that was it, do it just like they did there, a job. Work with him, I could trust him to do his end of this, he wouldn't let me down, but he wouldn't socialize with me. Double-cross? Maybe, but then again, if he tried it, he'd slip up and point a gun at me or something, and if he did that, I'd get him from behind just like I did to that scrawny little slopehead who caught me outside that village and wanted me as a Christmas present for Ho . . . hunh, he might try to double-cross me, but—

I breathed. "O.K., Coy. The proposition sounds interesting. Two questions: How do you plan to do it? And why do you need me?"

Coy chuckled, and there was something in that rolling, rumbling sound that made me uneasy. "Simple, Jones—dig this. Every night, old Moneybox goes into his bedroom, locks the door, pulls the curtains down, opens his safe—"

"I thought you said he keeps the money under his bed, in a shoe box?" I interjected.

Coy slapped his thigh and laughed. "That's where the safe *is*, man! That dude has got to be the only miser in the whole world with a wall safe under his bed!"

"Oh—O.K., go on."

"He opens the safe, takes out this shoe box, and then sits on the bed cross-legged—you know, like a tailor?—and counts the damn money. Then he puts it away again and goes to sleep."

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I chewed my lower lip for a moment. "So how are you planning to get at it? You said there're some ugly goons working for him, and—"

"Don't you worry none, Jones," he smiled.

"What do you mean?"

"O.K., listen good, now. First, Moneybox got the penthouse of a big apartment building. He figures that makes him safe, right? Goons on the stairs, private elevator, roof secured, windows barred, the whole works. He figures ain't nobody gonna get into that penthouse, but—" Coy's eyes sparkled and his finger began to jab the air, as though he were poking at my invisible chest "—but what he don't worry about is the apartment building across the street."

I shook my head in confusion. "I don't follow you."

"Now, now, let me finish, hey? Those two buildings, they about fifty feet apart. His is higher than the other one. Now, on the roof of the other is a little shed—the roof of that shed is on a direct line with Moneybox's windowsill, which lets you see right into his God-damn room when the curtains are open—which is how I know about all this, 'cause I was up there with a certain little lady one night, and I roll over and I notice folding currency being flashed in that room—he forgot to close the curtains—and I got a sharp eye for that kinda thing. So I checked up on him, and he does the same thing every night. Cool?"

"Yeah, sure, Coy, but that still doesn't tell me how we're going to get his money away from him."

"A breeze, man! You and I just go up there tomorrow night." He swiveled his head to one side to check the dial of a clock radio on one of his dust-covered bookshelves. "Yeah, that man gone to bed already tonight, we have to get him tomorrow. We just go up there tomorrow," he repeated, "and you reach across with your power after he's taken out the shoe box, hit him on the head, and bring the money back across to where we are." He spread those flatiron hands of his far apart and beamed. "Simple?"

I frowned. "Not really, Coy."

"Why not?" he demanded, taken aback.

"Two problems: One, I can't get at him because of the curtains. I can't touch what I can't see. Two, I can't bring the money back."

Coy's eyes opened wide. "What's that you say, man?"

"I said, I can't bring the money back."

"I heard that. I mean—why?"

"Because—look, Coy, it's too damn complicated to explain. I can't, that's all—my power isn't that powerful."

He stared at me intently, scratching his jaw in thought. When he spoke again, there was an undercurrent of distrust deep beneath his words. "So you can't do it, huh? Hm-m-m . . . old Coy, he didn't

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figure on that . . . you *can't* do it? Or you don't *want* to do it. Or is it maybe that—"

"I told you, damn it, I *cannot* do it. I don't have that kind of ability. Believe me, Coy, I—"

"All right, all right." He waved his hand like a fan and I quieted. "Let's us study some, huh, Jones? I swear, there's gotta be a way . . ."

We thought. I reached for my beer and found it warm; the condensation on the side had dried off. I drank it anyway, sipping contemplatively, trying to produce an air of careful deliberation. Coy sprawled across the couch, idly scratching the hollow where his piston neck disappeared into his collarbone. Then he stirred slowly, his eyes beginning to glow, and his teeth gleaming in the semidark room.

"I got it," he announced quietly.

"How?" I put the beer down and leaned my elbow on the table.

He cocked his head a trifle. "Can you touch the curtains?"

"Sure. Why?"

"Come on, man! Just open them damn curtains, if you can touch them! Then you go into the room and get at him!"

I felt deflated. I mean, it was *my* power, right? And here was this—this not-me—person—telling me how to use it. How the . . . Christ, how come I can't think like that? Aloud, I said, "Yeah. That'll do it, all right, but—how do I get the money back across?"

Coy rolled over onto his stomach, propped himself up on his elbows, and stared vacantly over the arm of the sofa. Silent, he lay like that for several minutes. I got impatient. "Well?" I felt vindicated, and I'll bet it showed.

"You can't just make it fly across?" he asked, twisting his neck around to stare up at me.

"I'm a human being, Coy, not a bird. No, I can't 'just make it fly across'."

We sat through a much longer silence this time. Finally, just as the quiet began to pulse in time with the neon sign that still gushed its ghastly light into the room, Coy swung into a sitting position and said lightly, "Then I guess you just have to drop it to me, down to the ground."

I didn't say a word. I don't think I had to. Coy could feel my distrust when my eyes slapped his face. For the first time that evening, he fidgeted. Then he shrugged his shoulders and laughed nervously. "All right, Jones, you win. But you got any ideas?"

I was about to respond with something glum and discouraging when an idea *did* hit me. My battered chair squeaked unhappily as I quickly straightened; I slammed my hand down on the table and said, "Yeah!"

"Well, give, baby—don't hold back on old Coy."

I held up a finger and took the roundabout explanation. "Coy,

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you've got the look of a man who's spent time on the football field." I giggled. Shee-yit—one lousy good idea, and I felt drunk.

Coy was puzzled, but he dutifully nodded his head. "Damn straight, man—football was the only thing I liked about school. Played every day till the Army came hunting for me."

"Ever throw the ball any?" I asked archly.

"Sure—fact, you're looking at the baddest black quarterback my home town ever did see. Why?"

"Could you throw the football fifty yards?"

"Course I can—any smart-ass quarterback can throw for fifty. Come on now, man—what you getting at?"

I sobered. "I'm getting at money retrieval, Coy. Look, if you can throw a football fifty yards, you ought to be able to put it through a window fifty feet away, right?"

The puzzled look on his face deepened, and I enjoyed seeing it. "Yeah," he eventually conceded, "easy—but why?"

I dropped my game of goad. "Because, Coy, you are going to be throwing something—maybe a football, but I don't know yet—from that rooftop into Moneybox's room. That 'something' is going to have a string tied to it. Tied to that string will be a stronger cord. My power—when it's over in that bedroom—will catch the something, pull the string in, and grab the rope. Then it'll tie the shoe box, securely wrapped, to the rope. Then you, on the rooftop, will start pulling back the rope. My power will pay it out, which is why you pull it back, because I'll really be on the other end. What we'll have is sort of a shoe box cable car, straight across from one building to the other, high above the street. We'll just pull in all the string, and nobody—but nobody—will ever guess how we did it."

I grinned to see the rekindled fires of greed roaring in his eyes. "Like it?"

He whistled, long and low and respectful. "Yeah. I ain't too sure how it's gonna work, but I just know it's gonna." He shook his head slowly, and when he spoke again there was a note of wonder in his voice. "I just throw a football through a window, wait a few minutes, then haul in all that money. Yeah—I *like* it!"

"Good," I said, yawning and hoisting myself out of the lawn chair, "good." I yawned again, hugely. "Look, Coy—what do you say we adjourn, huh? It's late, and if I don't get my precious eight hours, my power starts to fail me. I gotta get back to the motel and rack." I walked over to the window and, leaning my forehead against the smudged glass, I looked out at the city.

In the area where I had been, casino lights were still blazing invitingly, almost as if their managers

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thought of gamblers as moths who could be sucked to their doom by pretty fires. I scowled, and turned to stare back into the gloom. "What time do we meet tomorrow? And where?"

Coy rose languidly from the couch, stretched his arms out wide as *he* yawned, and then beat his chest with a Tarzan drum roll. "I'll find you," he drawled, "at your motel, about six o'clock. We get something to eat first, then go play football. Good enough?"

"O.K.," I said, walking for the door. "See you then."

Outside, the night air was cool and clean. I could see a few brave, lonely stars in the sky. I buttoned up my jacket, put my hands in my pocket, and walked briskly home, watching my feet as I went.

The next morning, as I was stolidly working my way through a breakfast of six jelly doughnuts and a cup of black coffee, a full realization of what I was planning to do that evening galloped across my mind. I was going to rob someone. That night, Coy and I were going to go to the top of a building, from which I would send forth my power into the dark. Then I would stand on a narrow ledge and claw open thick, resisting curtains and knock a frightened man down and rob him.

It reared and neighed; its frightened hooves tore the barren ground and sent great dust clouds whirling. My God, what if something went wrong? What if I couldn't do it? What if Coy couldn't hit the window? What if the rope broke? What if we got caught—Mother of Christ—caught? Prison suit, high oak bench, rocks and hammers and machine guns shrieking at night and oh, Momma, I didn't want *that!* I just wanted to cheat at craps and never get caught, that's all—I didn't want to get hurt or buried or anything. I just wanted some money, that's all . . . just some money . . .

It flicked its tail and flashed away. Its hoofbeats died out quickly and the dust clouds settled and all was peaceful. I finished my last jelly doughnut, tossed back the mouthful of cold, dirty coffee left in the cup, and paid the man behind the counter. Then I left.

I was back in my room by three. Vegas is not the place to be if they won't let you into the casinos. I know—I tried a couple and was politely, firmly denied admission to each. By the time Coy's breezy knock rattled the flimsy motel door, I had emptied my ashtray twice and pulled every ball of loose wool off the cheap blanket. I was in the hallway almost before the door stopped shivering.

"Hey, man," Coy laughed, slapping me hard on the shoulder, "I got the stuff. You ready?"

He did have the stuff, all right. A reel of fishing line was crammed into his windbreaker pocket, a

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thick coil of nylon rope was pressed between his elbow and his chest, and a brand new football was swallowed by his massive hand. I took the rope, said, "Yeah," and we left.

Over dinner—two burgers, fries, and a shake each—at MacDonald's, we decided to attach the fishing line to the football's laces. We didn't say much else—I was pretty jumpy, and I believe Coy was too lost in the contemplation of a shoe box filled with money to use his mouth for more than chewing.

Our destination was close. We walked, leaving Coy's car parked in the MacDonald's lot. A nice evening—cool, gentle breeze, with the traffic noises somehow muted by the caressing air. I regretted stepping into the elevator of the apartment building.

On the rooftop, the wind changed its nature. It abandoned the loving playfulness it had had on the street and became a cold, steady pressure. Like most consistent facts and forces, it became something to be adapted to and then forgotten. I did so immediately, while standing outside the tiny structure that housed the staircase.

I looked around at empty concrete. Nothing. A three-foot wall hung to the edge of the building. Another shed was in the far corner. A huge TV antenna was in the middle.

Coy gestured wordlessly at the other shed, and we walked toward it, gravel crunching under our feet. Leaning forward slightly into the wind, I wondered about the gravel; I quickly dismissed the thought as irrelevant to our purpose. We stepped into the lee of the shed and Coy slouched against its faded brick wall.

"Now, we get up top of this here," he said, jabbing at the structure with his thumb, "and we see right down into Moneybox's bedroom. Nice angle, you can see the whole room pretty clear. Gimme a boost, man, and I pull you up after me."

I cupped my hands, Coy stepped into them, and together we vaulted him to the top. A huge black hand came over the lip immediately, and then I was next to him. We lay on the tar paper for a short moment and grinned foolishly at each other. Then we rolled gingerly to the very edge of the roof and stared out.

The sun was just setting. Between the graceless buildings swirled the first tentative patches of the murk of a city night. Headlights slashed the night coldly, the street lights had come on, and apartments in the slab of concrete across from us glowed with subtle hints of home and love. I flicked some gravel off the shed's roof and watched it disappear.

Coy told me to study the penthouse, fourth window from the left. I stared hard. The unlighted room was heavily shadowed, but I could

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see the window bars—crudely disguised as ornamental latticework—from fifty feet. Probing further into the room, I could make out a large bed, a desk, and a night stand, but the distance was too great and the gloom too deep for me to discern more than their outlines. I quietly cursed the binoculars I hadn't thought of bringing.

"Hey, Jones." Coy was whispering, despite our near-total isolation from the population of Las Vegas. "Can you go over there now?"

"Sure." I, too, whispered. "But why?"

"To reconnoiter, man!"

"Nope. My power can go over there, but my eyes stay here. I can't see or taste or hear through my power—only touch."

"You could go wait for Moneybox, couldn't you?"

"Sure, Coy," I answered patiently, "but as soon as he closes those curtains, I'm outside again. I can't work where I can't see."

"No, man—get 'im before he closes the curtains."

"And before he opens that safe."

"Oh." Coy subsided at that, and we waited the next twenty minutes in silence.

The night got darker. At one point, after I had blinked, I saw that the room had become brightly lighted. I was surprised. There is something about waiting that makes you recoil from the unsignaled occurrence of your expectation—you assume that your alertness will tell you that something is *about* to happen, not that something has just happened. Or so it is with me. My head snapped back and I felt Coy's monstrous hand engulf my shoulder.

"Get your ass ready, Jones," he hissed. "About two minutes now, at most."

Oblivious to all else, I saw into the bedroom with stunning clarity. The bedspread was blue silk, the night stand and desk rosewood, the carpet a fine Persian. From the gentle cream walls hung three Japanese woodcuts. At the thick oak door, a pudgy little man in a bathrobe was closing and locking his ultimate security. He shot home a heavy bolt and turned, rubbing his palms together in avid anticipation. He walked to the windows, stared out at the needlepoint of steadily shining lights, then pulled the curtains decisively shut.

"Give 'im another minute, Jones, let 'im open that safe before you move."

"Yeah." Stomach clenched, hands clammy, I tensed for the leap into empty night air. Coy released my shoulder at last.

"Go, you mother! Go!"

I went, wrenching myself in two as I hurled into the darkness that part of my being capable of exerting physical force. I stayed, sprawled on the rooftop, an immobile husk that could only see and direct. I went, and I went quickly.

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Over: To the drapes, part the drapes. See through my far-off eyes the funny fat man sitting Indian-style on his pretty silk bed, money box open. No time. Tear the drapes down, fat mouth gapes, fat eyes open, lips move wetly. I take two steps, he hugs money box closer, distance blurs but it looks like he's going to scream, he sees nothing as I hit him. Go to the window, damn!

Back: "Coy, there's a *window!*"

"Open it." Football poised, dancing lightly on long, nervous black fingers.

"No—it's big, plate glass."

"Break it."

Over: Get box, close it. Squint from rooftop to spot roll of tape. Take tape from desk, seal box tight. Pick up chair. From outside the shattered glass is a cloud of gnats.

Back: "Throw!"

Over: Watch ball come down softly, silently into waiting power fifty feet away. Detach line, drop ball carelessly to sidewalk. Reel in line, rope appears. Tie box to rope securely.

Back: "Pull!"

Over: Pay out rope, come to end of line.

Back: "Got it?"

"Ah-yup."

"Good, I—"

I didn't see Coy's arm move. It must have, though. I distinctly remember the sight—and the sound and the feel and the taste and, yes, even the smell—of a huge, solid, knotted pink and black fist slamming out of nowhere into my head.

I awoke on a bed. It was soft enough, but I was far from comfortable. My hands and feet were firmly lashed together and a blindfold was wrapped so thoroughly around my head that not even a crumb of light dropped through. I moved experimentally, and was surprised to discover that there were no aftereffects. My head was clear and pain-free. I was dismayed, though, at my helpless vulnerability, and I grunted angrily when I realized my position.

A gentle, well-modulated voice spoke from somewhere near my right elbow. "Ah, Mr. Jones, how nice it is to hear your voice. Good morning."

"Where's Coy?" I muttered, by way of reply. "The minute I get my hands on that no-good, double-crossing, black son-of-a-bitch, I'm going to—" I cursed him colorfully and explicitly.

The voice took on a decidedly disapproving tone. "Really, Mr. Jones. You should be grateful to Mr. Coy, not angry with him. After all, he *did* save your life."

That stopped me. "How?"

"Why, you could have slipped off the roof, Mr. Jones."

The thought chilled me. "O.K.," I conceded quickly, "I won't bad-mouth Coy." I paused. "Uh—I know this is a standard question

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to ask, but—where am I?''

"We brought you back to your motel room."

"Motel? Thanks—wait, *we?* Who is 'we'? Police?"

A chuckle escaped from the throat, but it was quickly caught and punished. "Not at all, Mr. Jones. 'We' are an organization devoted to eliminating chea—that is, we try to maintain the element of chance in our Las Vegas casinos."

I shook my head. "No, I don't under—"

"We own that casino you won in, Mr. Jones."

"Uh—so?"

"You robbed us, Mr. Jones. The manager, who is not one of us, suspected, but he could not prove it. Mr. Coy, though, informed us of what had transpired and we were angered. The family had to insist on reparations."

Family? I panicked. The ropes seemed to tighten suddenly, and it was hard to breathe. "Hey, no, I didn't—look I—"

"You took ten thousand dollars from us, Mr. Jones," the voice hummed relentlessly. "We wanted it back—"

"Take it!!" I burst out. "It's in the suitcase. A check. Rip it up. It's yours. Leave me alone, please. Take your money. I didn't cheat—just go away . . ." I was very close to tears.

"—with interest," he finished.

"Huh?"

He explained. "Our Mr. Coy devised a scheme that would get our money back, Mr. Jones, and allow us simultaneously to reprimand an irritating independent."

"Coy is a—"

"We are an equal opportunity employer, Mr. Jones," there was not the slightest trace of humor in the words, "and Mr. Coy is a valued operative."

"Um—so?"

"So the scheme worked and the case is closed. The independent has been chastised, you have been punished, and we have our money back. The casino check, by the way, is still in your suitcase." I felt him fumbling with the ropes on my hands. "Everything is settled, Mr. Jones. All debts have been paid."

I was confused. "You're not going to kill me?"

"Not at all, Mr. Jones. Ah, there." My hands were free. "You should be able to finish untying yourself after I leave. No, Mr. Jones, you're quite free to go."

"You're not worried about me? About my striking back, or cheating you again? About my power?"

"We were—for a while," he admitted.

"So?"

"So we took you to a doctor while you were asleep, Mr. Jones."

My fingers were scurrying, tracing the heavy pattern of bandages crisscrossed over my eyes. My voice started to tremble. "So?"

I heard the latch click shut. I was left alone in my darkness. ■

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The Far Call

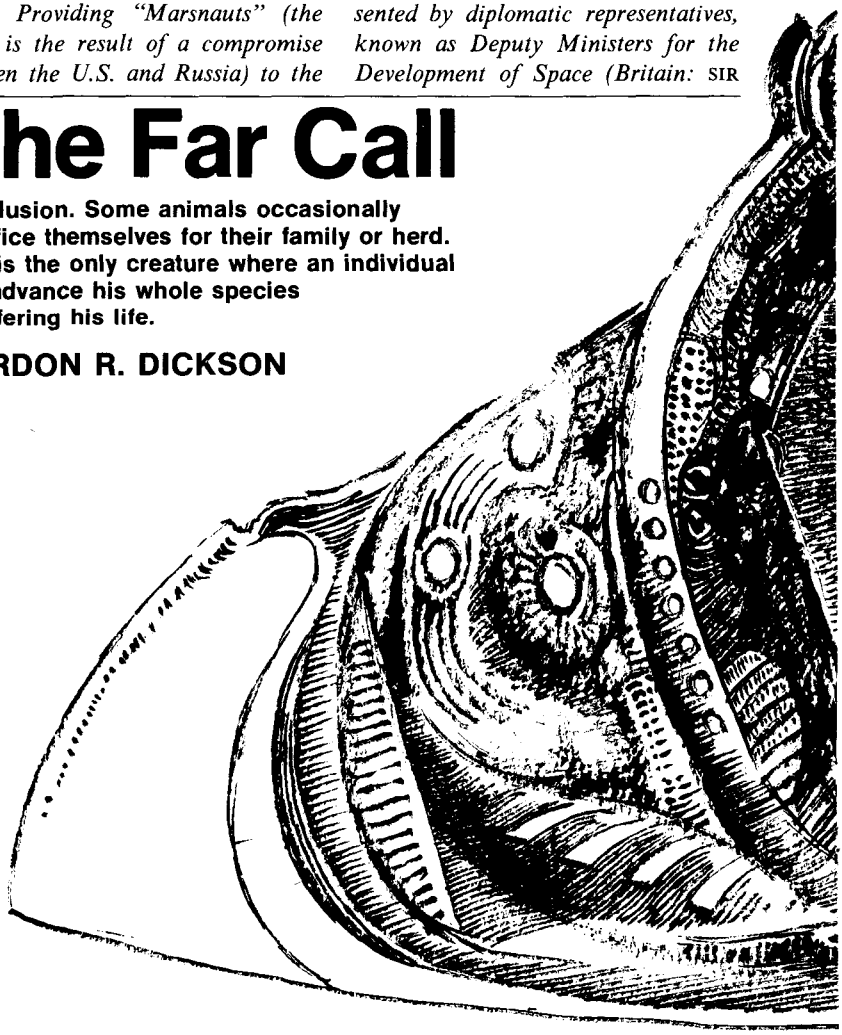
Conclusion. Some animals occasionally sacrifice themselves for their family or herd. Man is the only creature where an individual can advance his whole species by offering his life.

GORDON R. DICKSON

Synopsis

It is the early 1980's. After a period of dangerous cutbacks, the space program has been revived in the form of an internationally cooperative six-party effort, to take advantage of the 1983 launch window and make a manned, three-year, round-trip spaceflight and landing on Mars. Providing "Marsnauts" (the name is the result of a compromise between the U.S. and Russia) to the three-man crews of the two ships, are the United States: TADELL (TAD) HANSARD; *Great Britain:* DIRK WELLES; *the Pan-European Community of Nations:* BERN CALLIEUX; *Russia:* FEODOR (FEDYA) ASTURNOV; *India:* BAPTI (BAP) LAL BOSE; *and Japan:* ANOSHI WANTANABE.

These countries are also represented by diplomatic representatives, known as Deputy Ministers for the Development of Space (Britain: SIR



JOHN SCHOENHERR

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GEOFFREY MAYENCE; *Pan-Europe:* WALTHER GUENTHER; *Russia:* SERGEI VARISOV; *India:* MAHADEV AMBEDKAR; *and Japan:* MASAHARU TATSUKICHI—*plus their U.S. opposite number who goes under the comparative title of Undersecretary for the Development of Space, ex-newsman* JEN WYLIE.

As the story begins, the diplomatic representatives have just had lunch with the Marsnauts in their prelaunch quarters, the Operations and Checkout Building, Cape Kennedy. Upon boarding the bus that takes the politicos from the Operations and Checkout Building, JEN *uses a phone in the bus to call* WARNER (WARN) RETHE, *the U.S. Presidential Press Secretary, and asks if he can talk to President* PAUL FANZONE *about something that is presently concerning* TAD HANSARD, *who is the senior co-captain of the Mars mission (*FEDYA ASTURNOV *is the junior co-captain).*

TAD *is concerned that the load of scientific experiments required of the Marsnauts is too heavy for the safety of the mission, particularly during the first six weeks of the flight. He is trying to get word of this through* JEN *to the President, so that the six world powers involved can negotiate among themselves and reduce the number of experiments—in which a great deal of national self-interest and pride is concerned.*

The President, however, cannot talk to JEN *at the moment. The best the press secretary can offer is the hope of a chance for* JEN *to talk with the Chief Executive at the Presidential reception near the spaceport that evening, when* FANZONE *will be present in person. The President has otherwise avoided appearing on the Cape Kennedy scene, the political situation being delicate since the flight is from U.S. grounds. Technically,* JEN *is his representative on the scene in all things.*

That evening before the reception, JEN*'s girl friend,* ALINDE (LIN) WEST, *appears at the hotel where he and the other political representatives are quartered. He must leave her there while he goes to the reception.*

At the reception, JEN *suggests that* TAD *talk to* FANZONE. *But nothing seems to come of it until the reception is over, when he is held back from leaving for several minutes by* WARN RETHE, *so that* FANZONE *can talk to him.*

FANZONE *tells* JEN *bluntly that as U.S. President he is the last of the six political groups' leaders to suggest a reduction in the experimental work load on the 'nauts. This is because the U.S. already has too large a share in the Mars mission to begin with; and because, from a political standpoint, the mission itself is secondary to the international cooperation necessary to getting the people of the world to fund basic research that will relieve power and food shortages and clean up a disordered (if momentarily peaceful) Earth.* FANZONE *admits his own interest in*

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space development for its own sake; but says it must take a serving role to politics on Earth, and he must operate from that standpoint.

Blocked of help from the President, JEN *approaches* BILL WARD, *the Mars Launch Director, on the next morning, which is the morning of the launch.* BILL *admits that NASA is also aware that the experimental work load is dangerously heavy, but says that those who work in the space effort have struggled to keep the program alive, and daren't be the first to risk popular criticism of it now, by offending national pride.* BILL *cites a time when Kennedy workers were offered the choice of taking ruinous cuts in salary or resigning their jobs; and says the first duty of the workers is to keep the program alive for the sake of future launches, even if it means endangering this one.*

Frustrated, JEN *sees the shuttle launched, with no change in the work load.*

Meanwhile, aboard the shuttle itself, TAD *is considering what he must do, now that he has been unable to get help to reduce the work load. He is still turning the matter over in his mind as the shuttle delivers him,* ANOSHI, *and* BAP *to* Phoenix One, *the first of the two ships making the trip, and then goes on to deliver* FEDYA, DIRK *and* BERN *to* Phoenix Two.

He and his crew activate Phoenix One. FEDYA *and the others do likewise aboard* Phoenix Two. *They are ready to make their space launch from Earth orbit, into the long coasting orbit around the sun that will bring them into Mars orbit, nine months hence.*

Both ships are flanked by two nuclear boosters, each with its own pilot. At the given signal, the boosters fire, and Phoenix One *and* Two *are lifted toward Mars.*

The launch completed, the crews of the two ships prepare to dock them end-to-end and put them into a spin that will simulate about half a gravity—Skylab experiments in Earth orbit having proved that some kind of gravity (perhaps a full gravity) is needed if men in space are to remain healthy over a period of time. Since the Mars trip will keep its crews in space for three years (except for short excursions to the Martian surface) some kind of substitute gravity is needed.

Once the ships are docked and spinning, the experiments are set up aboard and the work schedule of the voyage commences. TAD, *who as senior captain keeps the log of the voyage, including the work done on it, makes an opportunity to talk to* FEDYA *alone; he says he has a plan for handling the overloaded schedule, if someone else will just come up with a slight disability—say, a hurt hand.*

FEDYA *turns up immediately thereafter with a bruised hand, giving* TAD *an excuse to juggle work schedules.* TAD *has refused to give* FEDYA *details of what he intends to do. Actually, he plans to take most of the*

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overload on himself, betting that he can last physically until the first six weeks are over and there is a slackening in the work load.

He succeeds during the first few weeks, but must skip his exercise to carry the work load. As a result he goes downhill physically very fast; and he is finally caught by FEDYA *and* ANOSHI *doing what has been his real scheme—faking the log entries to show himself healthier and less overworked than he is.* TAD *is forced to rest by* FEDYA, *who calls Kennedy and demands a reduction in the work schedule.* BILL WARD *(now Mission Director) promises to try, but says it will take time.* FEDYA *demands immediate action or he will reduce the work load without Kennedy's authority. At this juncture,* BILL *receives word that a solar flare is on the way. Very heavy, hard radiation will reach the ships in a few hours.*

This changes everything. In the case of a solar flare, the two ships are scheduled to abandon all usual activities, button up, separate, and attempt to communicate by LCO (Laser Communications) from ship to ship. They will both be out of touch with Kennedy until the storm subsides.

Both crews take refuge in specially shielded areas of the control rooms, known as "storm cellars." The storm, however, is much worse than expected, the radiation higher, and the LCO system on Phoenix One *goes out. After a while the radiation count outside the hull seems to dip into the safety zone, down enough for the crew of* Phoenix One *to move outside the storm cellar.* TAD *and the others move out, and trace the LCO trouble to the laser motor mount, which can only be reached by EVA.*

TAD *insists on going out, immediately.* Phoenix Two, *with which they are now out of contact, may be in trouble and need help as soon as possible. The radiation count is now theoretically in the safe zone.* TAD *goes out and finds he needs to replace parts to fix the mirror.*

Meanwhile, inside the ship, the storm has diminished to where auxiliary radio contact from Phoenix Two *is beginning to come through.* Phoenix Two's *LCO is unharmed, and she is now back in touch with Kennedy.* FEDYA *relays to Kennedy word of* TAD's *EVA.* BILL WARD *sends an urgent message that* TAD *should get back inside at once. The decrease in radiation* Phoenix One *had observed was only temporary. A "burp" of radiation is following right behind the slope of the first decrease.*

BILL WARD *starts a check on how much radiation* TAD *may have received while he was outside. The word comes back that it is high, very possibly lethal.* WARD *turns away from the LCO screen, stunned. Sitting behind him, in the observation booth of the Mission Control Room, is* WENDY, TAD's *wife; and now* BILL *has the job of breaking the news of what has just happened . . .*

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Part 3

XII

Tad came in through Hatch Three to the air lock into the end of the access tube, down the tube and out onto Deck A. In the spacesuit, it was necessary to back onto A Deck through the hatch. When he turned around, he saw Bap a few feet off, holding a radiation counter.

"Get out of that suit as quick as you can, Tad," Bap's voice sounded in his earphones. "We've just got word from Kennedy relayed by radio from *Phoenix Two.* Something went wrong—it was still hot outside. Strip and we'll get to work on you right away."

"Hot?" said Tad. He felt a little emptiness just behind his breastbone and noticed neither of the other men was coming forward to help him off with his suit. "How hot? How hot am I now?" He began to struggle out of the spacesuit.

"Don't know what it was outside," Bap said. He looked at the counter in his hand and hesitated. "Hard to say about you. It's jumping around. Say . . . a hundred and eighty rem; probably most of that in your suit."

Tad got the helmet off and heard the soft buzzing of the radiation counter. He climbed out of the suit and dropped it at his feet, then stripped off everything else.

"Right," said Bap. "Now, down to the shower."

Tad preceded him down to the waste management room.

"I contaminate this," he said half-jokingly as he stepped inside, "and you two may have to go dirty the rest of the mission."

"We can dump the water," said Bap. "Anyway, we'll see. Scrub off as much as you can."

Tad closed the shower door and turned on the water. He stayed under it until there was a knock on the door and he heard Bap's voice calling him. He stepped out and put on the fresh onboard suit Bap had waiting for him.

"Now the tough part," said Bap.

His voice was light; but Tad's fully alarmed senses caught something different in the way he spoke; an almost-gentleness that alarmed Tad even more. He did not have to ask what the tough part was. They had all been fully informed about procedures in case of radiation poisoning of any of them—whether from space or from some accident with the big nuclear engines in the shuttle that was to be their main drive once they reached Mars.

He went ahead of Bap down to the infirmary and stretched out on a table there. A mass of clustered, red-filled tubes stood in a cradle beside the table. It was fresh, whole blood—thank God that recent improvements in flash freezing and cryogenic storage made it possible for the spacecraft to carry supplies of fresh blood with them in the frozen state. Bap had probably

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started it quick-thawing with the deep-heaters before Tad had stepped out of the access tube onto the floor of A Deck.

Bap was looming above him, dressed now in special protective smock, mask and gloves; because now the time had come when he would actually have to touch Tad's body, itself undoubtedly radiating and dangerous. The wearing of the protective clothing was laid down strictly in the operating procedure, but still it made Bap look uncomfortably alien and unfamiliar. Tad felt the small pricking of needles as Bap hooked him up to the apparatus that would flush his present contaminated blood from his body and replace it with the clean blood. Other needle pricks followed; and Tad felt the anxiety quieting in him. Bap must have given him some sort of tranquilizer, among other chemicals. A drowsiness approached him. He closed his eyes. The hard surface of the table beneath him felt almost soft . . .

He drifted back to wakefulness to find himself lying on the bed in his own sleeping compartment, with Bap standing beside him holding a hypodermic needle—putting it away on the bedside table, in fact. Tad had a vague memory of being helped back here from the infirmary compartment, some time since. He felt filled with lassitude, but otherwise very good—perhaps the hypodermic needle he had just seen had something to do with that.

"How am I?" he asked Bap.

"You're starting to be safe to touch," Bap smiled.

Tad came further up the slope of wakefulness into an area of concern.

"How's the ship?" he asked. "What's been happening?"

"Our LCO's still out," said Bap. "We've been talking to *Phoenix Two* by radio; and they've been talking to Mission Control. Both ships got hit a lot harder by the storm than we thought. All sorts of systems are knocked out on both of us. We're all working to get things going again."

Tad rose on one elbow.

"I've got to get up," he said.

Bap pushed him back down.

"No," said Bap. "You're supposed to rest."

"At least get me a phone hookup down here, then," said Tad. "Patch me in with the communications system so I can talk to Fedya. I want to know what's going on."

"All right," said Bap. "We can do that much, I suppose."

He went out of the compartment. Some ten minutes later, the intercom unit by Tad's bed buzzed. He propped his pillow up against the bulkhead at the head of his bed and sat up against it. He leaned over to snap on the phone; and Anoshi's face took shape in its screen.

"We've got Fedya on the radio

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for you," said Anoshi. "Hang on, there . . ."

The hiss and crackle of static moved in over his voice. Anoshi's face stayed on the screen, but Fedya's voice came through.

"Tad?"

"It's me," said Tad. "Can you hear me?"

"I can hear you all right. Can you understand me?"

"You're a little blurred by static," Tad said. "But not enough to matter. Why haven't you got *Phoenix Two* back with us by this time?"

"The storm . . ." a louder rush of static did, at that moment, wash out Fedya's words. ". . . control systems are out all over the ship. Our maneuvering thrusters are not responding properly. I was afraid we couldn't control any docking attempt. We have trouble enough right now without smashing the two ships together and damaging them. We don't even want to risk approaching you too closely."

"Maybe we can dock with you holding still, then," Tad said.

"Anoshi tells me your control systems on *Phoenix One* are also unreliable," said Fedya.

The lips of Anoshi's image moved on the intercom screen beside the bed.

"That's right, Tad," Anoshi said.

"What's holding up getting them fixed—here as well as on *Phoenix Two?*"

"The extent of the damage." Fedya's voice cut across Anoshi's; as Anoshi started to speak, then stopped. "And the shortage of repair parts."

Tad stared at the screen.

"Say again?"

"I said—the shortage of repair parts," Fedya's voice answered. "Both here and on *Phoenix One.* We do have undamaged parts and equipment to substitute; but not as much as we thought. Apparently certain sections of both ships that were originally planned to hold reserve equipment and spare parts have been devoted instead to the loading of equipment required for the experiments. Either that, or the loading list is in error."

Tad swung his legs abruptly over the edge of the bed and sat up facing the screen without benefit of pillow.

"You mean they sent us out with not enough supplies and equipment for repair on either ship?"

"Not necessarily," said Fedya. "What was sent was probably considered adequate. But they didn't foresee such extensive damage to both ships at the same time."

"That's not the point!" said Tad. "The point is, if I understand you, in order to get more experimental stuff on board, they shaved the repair margin too thin. Is that the situation, or isn't it?"

"You could say it that way," said Fedya.

"Have you talked to Mission Control about this?"

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"I gave them a brief report," Fedya said. "I was waiting until I had definite information on what we were short, before I went into the matter more deeply with them."

"You've still got your LCO working?" Tad demanded.

"Voice only. The picture is out. But I've been in voice contact with Mission Control, ever since we realigned the *Phoenix Two*'s mirror with them after losing contact with *Phoenix One*."

"Patch me through to Bill Ward," said Tad.

Both Fedya and Anoshi spoke at once; so that neither one was understandable. The face of Anoshi moved out of the bedside screen and that of Bap replaced it.

"Tad," said Bap, "you're in no shape to be talking to anyone."

"Yes, I am," said Tad. "I feel fine. Fedya, patch me through to Mission Control."

The picture on the screen vanished. The sound of several voices speaking at once tangled together and then went silent. Tad half stood up from his bed, thinking he would go up to A Deck in person and force the issue. Then he sat back down again. They would not deliberately keep him from speaking to Mission Control.

Sure enough, after several minutes, the screen lit up again with Anoshi's face and the speaker of the intercom hissed with radio static.

"All right, Tad," said Anoshi. "We're through to Mission Control for you."

He stopped speaking; and a voice came through the static that Tad recognized.

"Tad?" it said. "Tad, Wendy's here. She's been here at Mission Control since we heard about you."

"Wendy?" said Tad. He leaned convulsively toward the intercom. "Bill? That's you, Bill Ward, isn't it?"

"It's me," said Bill's voice. "Just a second—Wendy—"

"Tad!" It was Wendy's voice.

"Wendy, what're you doing there? Where are the kids?"

"At home. They're all right. Tad, how are you?"

"I'm fine!" he said. "Fine! I don't feel a bit different from usual. Look, don't you hang around Mission Control. There's no need to."

"All right. Tad, honey, there's a doctor here who wants to talk to you."

"Wendy—" Tad was beginning; but another voice was already speaking to him.

"Tad? This is Kim—Kim Sung. Can you hear me all right?"

"Read you fine, Doctor," said Tad, impatiently. Dr. Kim Sung was one of the NASA physicians. "What is it?"

"I'd like you to answer some questions, Tad. How do you feel at the moment?"

"Fine, Doctor."

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"Any nausea, vomiting, or diarrhea?"

"No—I told you."

"How about earlier? Did you have any upsets like that earlier, Tad?"

"After I came in and Bap pumped all the blood out of me and shot me full of someone else's blood and a lot of chemicals," said Tad. "I was a little nauseated, yes, and felt bad. But that all went away some time ago. Look, Doc, don't let Wendy get away there, or Bill Ward. I've got things to talk about with them, and things to do."

"I think you'd better take it easy for the present, Tad," said Kim Sung. "How's your appetite?"

"I'm not too hungry—but then I just woke up," said Tad. "Honest, Doc, I'm fine. Got my hair still on my head, and everything."

"Tell me, when you first came in from being outside and exposed to the solar storm, did you feel at all warm or feverish . . ."

The questioning went on. Gradually, it began to register upon Tad that he was not going to be given the chance to talk over the repairs situation with Bill Ward, after all. And not merely that; as the medical voice continued evoking answers from him, his concern for the mission began to move back in his mind and give way to a more personal attention. That touch of immediate emotion that had been like a small, cold finger touching behind his breastbone when Bap had first told him he had been exposed to the solar storm, now returned. It returned; and this time it lingered.

XIII

The press conference was held in the same hotel where the Deputy Ministers of Science of the countries cooperating in the mission were still quartered—including Jen Wylie. No place else was large enough for it except the enlarged press stands out at the Cape, itself; and it was unwieldy to move all the newspeople out there just to speak to and with them.

The fact of the matter was, Jen had noticed, that the press corps in the Cape area, instead of declining in numbers after the launch, had grown as the feature writers moved in. Now, in addition, there had been a sudden added influx of men and women with orange press badges, as word escaped of the solar storm, the damage to the two spacecraft and Tad's accident.

The ballroom was equipped with high balconies at the back, overlooking the floor where folding chairs had been set up for the attending newspeople. These balconies gave an opportunity to seat a few groups of non-newspeople who were nevertheless concerned or interested in the news conference. One of these groups was made up of the Deputy Ministers, and they were all there.

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"Shame about that young man of yours," said Sir Geoffrey, gruffly, sitting down next to Jen. He was obviously referring to Tad.

Jen nodded.

"Yes," he said. He felt that he ought to find something more to answer with; but no more words came to him. He gave up and leaned forward to see the Mission Control people filing onto the platform at the far end of the room and taking seats behind the long table there. There were five of them, one brown-faced and oriental-looking; but the only one Jen recognized was the upright, bulky shape of Bill Ward, who seated himself in the center.

There was a moment of fiddling with the pencil microphones among the water glasses on the table in front of the five; and then Bill Ward cleared his throat.

"All right," he said; and his amplified voice boomed out through the room. "We might as well get started here. I'm going to give you a short statement to begin with, then we can have questions."

He cleared his throat again, and glanced down at some papers he had spread out before him on the table.

"At twenty-three hundred hours, twenty-six minutes of Day Twenty-two of the Mars mission," he read, "Mission Control received from Spacelab Two a prediction of a strong solar flare, which prediction was communicated to the Mars mission spacecraft with the information that the mission had approximately five hours in which to undock and separate the spacecraft in order that experiment SO82, a test of laser communication between the ships during a solar storm, could be performed—"

He coughed, interrupting himself; and then went on.

"The two spacecraft," he said, "accordingly undocked and separated a distance of one hundred and forty kilometers, while the crews aboard both ships erected the protective panels to create the so-called storm cellar described in Experiment M199. The estimate of the duration of their stay in the storm cellar was placed by Mission Control at approximately fifteen hours, during which time, because of the alignment of their LCO mirrors on each other, neither craft was in communication with Mission Control."

He paused and took a sip of water from a glass before him.

"At approximately seventeen hundred hours, forty-one minutes of Day Twenty-three," he continued, "the crew of *Phoenix One* observed that their LCO was no longer communicating with *Phoenix Two.* They checked for malfunction within the area of the storm cellar and found nothing. At this time, the meter reading the external radiation of the solar storm, was beginning to show an apparent reduction in that radiation. The

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meter showed a continuing reduction; and at the point where it showed that all danger was passed for the Marsnauts in moving around within the spacecraft, the crew of *Phoenix One* left their storm cellar and traced the malfunctioning LCO system to the point at which it went through the hull to the drive unit that positioned the laser mirror outside the ship.

"It was evident that the malfunction was outside the ship, rather than inside. Radio communication being still impossible under the solar storm conditions, and Senior Mission Commander Tadell Hansard, fearing that the LCO on *Phoenix Two* might also be malfunctioning, decided on an EVA to inspect the drive unit and the mirror outside the hull.

"He accordingly suited up and made the EVA, unaware that radiation outside the ship was still at danger levels. The force of the solar storm had been greater than predicted; and, in fact, great enough to overload *Phoenix One*'s radiation meter, with the result that it had falsely showed the radiation reducing more rapidly than was actually the case.

"As a result, Colonel Hansard suffered a presently unknown degree of radiation poisoning. Luckily, the LCO of *Phoenix Two* had not been affected by the solar storm; and finding herself out of contact with *Phoenix One* by that means, *Phoenix Two* contacted Mission Control by LCO and *Phoenix One* by radio—the storm having decreased enough to make this possible. As a result, she was able to convey a warning about the dangerous level of radiation into which Colonel Hansard had EVA'ed; and as soon as Colonel Hansard returned to the interior of *Phoenix One,* his crewmates took steps to decontaminate him and offset the effects of the radiation.

"He is now resting comfortably, according to our last word from *Phoenix One.* However, both ships have suffered extensive damage to their electronic control systems as a result of the unexpected severity of the solar storm; and the crews of both ships are busy checking systems and putting them back into operation."

Bill ceased talking, shuffled his papers together and looked out at the crowd.

"Copies of this release are available on tables at the back of the room," he said. "Now, let's get to the question period."

A woman was standing in the front row before he had quite finished speaking. Behind her, several other people who had been a second too slow sat down again.

"There is speculation—" her voice was so thin it was barely audible up on the balcony where Jen was, and then a seeking microphone picked her up and the rest of her words blasted from the wall

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speakers, "that the U.S. Marsnaut, Tadell Hansard, has actually received a lethal amount of radiation. Could you tell us if that is indeed the fact?"

She sat down again. Bill bent his head toward the oriental-featured man on his right.

"Kim? Do you want to take that?" he said. Jen's lagging memory supplied the full name of the man addressed. Dr. Kim Sung, one of the NASA physicians. Kim Sung was leaning toward his own pencil mike.

"I'm afraid we have no idea how much radiation Tad received," Kim said. "We have no means of knowing what the radiation was outside *Phoenix One* at the time he was exposed; and we would have no way of determining the extent of the damage to him, physically, otherwise, at this time. I might say, though, that to assume that any dose of radiation poisoning is necessarily a lethal one, could be to fall into pretty serious error."

Several other newspeople were now on their feet; but the woman in the front row persisted.

"But you would not completely rule out the possibility that he had received a lethal dose of radiation, Doctor?"

"In the absence of sufficient facts, all possibilities have to be considered, certainly," said Kim. "But we aren't spending a great deal of our time on that particular one."

"Next," said Bill Ward firmly, as the woman opened her mouth again. She sat down. A man several rows back with a European accent Jen could not pin down, found himself chosen by Bill's pointing finger.

"Have you any idea of the extent of the damage to the two spacecraft, sir?" he called. "And if so—"

"No. No knowledge whatsoever, yet," said Bill. His finger moved on. "Sorry to cut you off. But we've got a large group here and we'd better limit it to a single question apiece. Next!"

"Would you tell us," another woman said, "if radiation damage to electronic systems alone would be enough to permanently disable a spacecraft like *Phoenix One* or *Phoenix Two?*"

"Jim?" Bill turned his head, passing the question along to a balding, round-faced man on his right.

"Theoretically," James Howell, Systems Engineer for the mission answered her, "if enough systems were knocked out at once aboard her, one of the *Phoenix* craft could be completely disabled. However, she would remain disabled only until her crew could repair the damage and replace the necessary parts to get her working again, which is what the crews of *Phoenix One* and *Two* tell us they are presently doing."

"Next!" said Bill.

"Assuming Tad Hansard is seri-

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ously ill from the radiation—or worse," asked a black-skinned, turbaned man standing among the rows of seats away to the right side of the room, "how will this hamper the continuance of the mission?"

"The mission," said Bill Ward, "is already redundant in the fact that it consists of two identical ships, each of which is capable of making the mission by itself. If Tad's going to be laid up for a while, of course, that will require some readjustment of work schedules aboard at least *Phoenix One,* and possibly aboard both ships."

"Can you tell us," said yet another woman, "if it is correct that the crews of *Phoenix One* and *Two* had already requested a readjustment of the experiment priorities, before the present emergency happened?"

"The matter had come up for discussion, yes," said Bill, harshly. "Both the 'nauts and Mission Control are constantly evaluating and re-evaluating the elements of the mission for maximum performance. But, of course, anything like this has to take a back seat now to the larger matter of getting the spacecraft back to full performance. Next!"

"Assuming the death of Colonel Hansard as a result of this radiation poisoning—" began a man near the front.

Jen felt a sudden wave of nausea. It came on him so suddenly that it was almost as sharp as an unexpected pain. He clutched reflexively at the arm of the chair in which he sat, pushed himself to his feet and stumbled unsteadily back through a curtain and a door beyond into the silence of the wide, carpeted corridor that lay at the back of the balconies.

He was aware abruptly that someone had followed him. Surprisingly, it was Sir Geoffrey, and the tall old man had a grip on his elbow, steadying him.

"Little shaky, there?" muttered Sir Geoffrey, not unkindly, in his ear. "You need a drink. Come along . . ."

He steered Jen down the corridor with a clutch that was surprisingly powerful for someone of his visible age. They entered an elevator, went down to the second-floor lobby, and from there into a large dim bar with overstuffed furniture and one waitress. Sir Geoffrey piloted Jen to a booth against a wall opposite the bar and pushed him into a seat there, sitting down opposite him. The waitress came over.

"What would you like?" she asked.

"What's the specialty of the house?" Sir Geoffrey asked her.

"The special drink?" she said. "The Shamrock. That's the name of this bar—the Shamrock Lounge."

"Shamrock? Irish whiskey, isn't it? All right," said Sir Geoffrey. "Bring him one."

"Nothing for you?" she asked.

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"No. I—well, damn it, give me one, too."

"Two Shamrocks," she said, and went off.

"Always order the specialty," said Sir Geoffrey, looking across the table at Jen. "Get more for your money; and the chances are better than even the drink'll be made right, too."

Jen felt he ought to say something; but the effort was too much.

"That's right," said Sir Geoffrey, encouragingly, "you just sit there. As soon as you get a drink or two into you, you'll feel better. Alcohol, coffee and iodine—cure anything in the world, one of the three.'

There was a little pause. The waitress came back with the two cocktail glasses, green liquid lapping at their rims, and set them down, carefully, in front of Jen and the other man.

"Drink it, now," said Sir Geoffrey when the waitress had gone. "Pour it down, if you're up to that. Most irritating thing in the world, buy somebody a drink to help their nerves and they sit there and play with it. Women do that, a lot. Here, I'll show you how."

He drank from his own cocktail glass. Jen reached out and lifted the one in front of him to his lips. In the moment before he sipped at it, he thought he could not drink anything. Then it was in his mouth, and the taste was mint-like and not unpleasant.

"That's better," said Sir Geoffrey. "Let it hit bottom now, and you're halfway back to health. Upset about Tad, weren't you? You shouldn't be in this kind of work. Bloody amateur—oh, I know that's what your government wanted to prop up in the shoes you're wearing, but it's sickening all the same. Waitress! Two more."

"No, one's plenty—" Jen was beginning, but the waitress was already giving the order to the bartender.

"What you've got to face," said Sir Geoffrey, "is that somebody's always bound to get hurt in things like this. That's the way international politics is. That's why you need professionals. You think we've been somewhat rough on you, I suppose—myself and Guenther, and Mahadev, and the rest. But it's just too messy, trying to absorb a beginner into the situation. Beginners are God's curse; and we've all had to endure them from the top down until we're soul-sick about it. Amateurs do everything wrong—ah, thank you, dear. Drink up the second one now, Wylie. Just like you did the first."

Jen was, in fact, beginning to feel—if not better—anesthetized to a small extent. He picked up the second drink.

"What you've got to understand, for your own sake," Sir Geoffrey was saying, "is that there's always a mess. Always. You've got to learn to just let it happen—"

"And to hell with everybody, I

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suppose?" said Jen. He was a little surprised to hear himself say it. The first drink was already beginning to work on him.

"Not to hell with everybody!" said Sir Geoffrey, irritated. "To hell with the situation and anyone who is so tangled up with it he can't get loose. You're just a piece of machinery, if you're good at this work. You don't smash yourself on the first problem that comes along; you keep yourself whole so you can be used again—and again. Otherwise, the business does go to the bloody amateurs; and if they'd been able to handle it, they'd never have developed professionals to handle it for them in the first place!"

"That mission," said Jen, a little thickly—and was surprised to see that his second cocktail glass was empty. Sir Geoffrey was already wagging a long forefinger in signal to the bartender. "That mission was sabotaged before the Marsnauts ever got into the shuttle and left the ground."

"True, no doubt at all," said Sir Geoffrey. "And you knew it and did nothing about it. Nothing that made any difference, that is."

"Yes," said Jen, sickening again inside at the thought of Tad Hansard.

"And you're not going to do anything now or later, take my word for it. Outside of the fact they'd find you guilty of violating your own National Security Act and Espionage Law and lock you up for fifteen years—people in our positions just don't meddle in that sort of business," said Sir Geoffrey. "Now drink up, brace up to the facts of life, and let's get back to that balcony before the press conference ends and anyone notices we've been gone—anyone important, I mean to say. Our fellow workers in the vineyard don't count."

Fedya stood in his spacesuit on the hull of *Phoenix Two.* Half a kilometer away, the lighted part of the hull of *Phoenix One* looked like a lopsided rectangle in the illumination of the raw sunlight. A wire from a spool clamped to the hull of *Phoenix Two* by her Hatch Three led to Fedya's belt; and an individual propulsion pack was strapped to the shoulders of his suit.

Keeping his eye on the reflection of the distant spacecraft hull, he rose on his toes, flexing his bootsoles to cut off their magnetic attraction to the metal of the hull beneath them, and sprang outward from the ship. It felt as if nothing had happened. There was no sensation of movement; but then, extending his legs, he found no solid surface with them, and, turning, he saw the hull of *Phoenix Two* now something like his own length from him.

He turned back to locate the hull of *Phoenix One* with his eyes,

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raised his gloved hand to the chest of his suit and activated the propulsion pack.

Cold gasses spurted from the two thrusters at the tips of the twin arms extending from the pack. Still, there was no feeling of movement toward *Phoenix One;* but when he looked back again, he saw *Phoenix Two* visibly shrinking as he watched, the bright, thin line of the wire from the slowly unreeling spool at his waist in a catenary curve between himself and the ship he had just left. He turned back to concentrate on the lighted section of the hull of *Phoenix One,* toward which he flew.

For some time, it was hard to see any change in it. But gradually he became aware that the rectangle was apparently growing out toward his right and shrinking in to his left. He was headed off at an angle that would take him past the other spacecraft on his right, unless he corrected.

He corrected, gradually adding pressure to his right thruster until the rectangle ceased to grow in the manner it had been growing.

He traveled on in apparent motionlessness through space. There was no pull at all that he could feel from the wire attached to the heavy belt around him. He noticed abruptly that the rectangle was once again changing. Now it was narrowing—narrowing rather rapidly, so he must be getting close to *Phoenix One.* Getting close and sliding away at an angle above it. He corrected again.

The rectangle broadened once more. He was now close enough to see, within its lit area, the erect shape of the copper LCO mirror and a corner of *Phoenix One*'s Hatch Three.

Fedya was correcting constantly now, as he zeroed in on the other spacecraft. His target was no longer just the hull itself, but that same Hatch Three. Playing with the controls of his propulsion pack, he drifted toward it. Abruptly, he found the need to decelerate was upon him. The hull and the hatch were growing in size swiftly before him. He rotated the handle on his chest that turned the nozzles of the thrusters about a hundred and eighty degrees, and opened their valves full.

Once more, there were moments in which it seemed that what he had done was having no effect whatsoever. The hull continued to swell toward him; and he drew up his feet instinctively to take the shock of a hard landing. But then, the swelling slowed, slowed . . . and he awoke suddenly, only a few meters from his destination to discover that he had now reversed his movement; and was in fact drifting back, away from *Phoenix One.*

He cut the valves off completely, reversed the nozzles of the thrusters again; and with weak jets of gas began to work his way back toward the hull. It was a good five minutes

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more, however, before his feet at last touched down and the magnetics of his boot soles gripped the hull.

He clumped over to Hatch Three and the bit which had been welded beside the hatch to secure the end of the wire he had carried over from *Phoenix Two.* As he was detaching it from his belt and securing it, the cover of Hatch Three opened; and, moving as ponderously as some medieval armored knight, another spacesuited figure emerged to help him tie down the wire to the bit, and connect it to the end of another wire waiting there, before following him back down inside *Phoenix One.*

The manner of the other figure's movement identified the man within its suit. It was Anoshi. At another time there would have been something cheerful said between the two of them over the suit phones as they met. Now, however, they went in silence together back inside the ship, through the air lock at the end of its access tube and on to A Deck where they removed their suits.

Desuited, finally, Fedya turned to face not only Anoshi, but Bap and Tad. Tad was not even sitting down. He was standing by his control console. Fedya went over to him and gripped his hand.

"How are you feeling?" Fedya asked.

"Fine," said Tad. "I'm feeling up to anything and just fine."

Fedya smiled at him. But Tad was not looking fine. He was looking . . . different. There was no greatly visible change, but his face seemed more bony and pale than Fedya had ever seen it before. For a moment, Fedya was baffled as to why it gave that impression. Tad had worn his hair cut short always, so that the difference was not remarkable; but his hairline had gone back and scalp was showing under what remained. Also, there was a sense of strain about Tad, a tension, as if he were trying to be polite at a social occasion when flu, or a bad cold, was making him long to be home in bed.

XIV

Tad was not fine. This was the second day now since the return of the nausea and the general feeling of malaise that he had felt a little after Bap had changed his blood, when he had first come back into the ship after being exposed to the radiation. Now, as then, he was determined to hide the way he felt; but it was hard to tell how well he was succeeding. The 'nauts had lived together too closely, too long, to be easily fooled by any one of their number.

Fedya, Tad saw, certainly suspected. And Fedya was a problem, since he represented what Tad feared most—that Mission Control might take Tad's official command of the mission away from him.

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From the moment he had returned inside the ship after being exposed to the solar storm, he had not forced his authority upon the others; and neither Bap nor Anoshi, at least, had challenged the fact that he still had it.

Fedya, however, as junior co-commander of the mission might just be the one who would challenge that authority—with the result that Tad might lose it. Only, he could not afford to lose it. He trusted none of the others to take the necessary action with respect to himself, when the time came. And the time would come soon now. He turned from Fedya to Anoshi.

"Connected?" he asked.

Anoshi nodded.

"We're tied in by direct line now with the *Phoenix Two* LCO," Anoshi said. He glanced at Fedya. "I take it for granted *Phoenix Two* had the other end of the wire already spliced to its LCO?"

"It's spliced in," said Fedya. "Why don't you call Mission Control and say we're ready here any time Bill Ward is ready?"

"I'll do that," said Tad.

He turned about and sat down at his control console. It was a little strange after these several days of always going to the radio for outside communication, to be punching the buttons of the LCO as if the copper mirror outside the hull of *Phoenix One* were still capable of being aligned properly. It almost seemed as if the picture and the voice that was now coming in over the wire to the LCO of *Phoenix One* ought to have some noticeably different quality. But the image of Al Ciro's face and the sound of his voice that the console produced was the same as it had been in past days before the solar storm.

"*Phoenix One* and *Two* calling Mission Control," said Tad into the mike grid. "Do you read me?"

Al's lips moved on the screen and Tad heard his voice answering.

"Read you perfectly," he said. "You did get the two craft wired together, then?"

"Fedya just did," said Tad. "So now we can shift supplies between ships without docking." He was about to say more but a wave of nausea stopped him. "I'll . . . pass you over to Fedya." He got up, stepping away from the console so that he stood with his face turned away from the others, waiting for the feeling of sickness to pass.

"Hello, Al," he heard Fedya saying behind him. "I'm on *Phoenix One.* Any time Bill Ward is ready to talk to us, we're available."

"He'll be with you in a moment, Fedya. He's on the phone at the moment . . . here he comes, now."

Al's face moved off to one side of the screen and the face of Bill Ward replaced it.

"Hello, *Phoenix One* and *Two,*" said Bill. "Look, we've gone over the data on both ships that you've been feeding us during the last few

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days. As far as we understand, it boils down to this—"

He paused and glanced down as if at some papers below the frame of vision of the screen.

"Both ships are operable after a fashion; but both ships have suffered extensive damage to their electronic systems—particularly their control systems—as a result of radiation from the solar storm. Some of the damage can be repaired by pooling spare parts from both ships. But among the important systems which can't be repaired, are the LCO of *Phoenix One,* and the main engines of the shuttle module of *Phoenix Two,* of which only two out of five will fire. Also, you don't expect to be able to repair your attitude controls well enough to redock the two craft together. Am I right?"

"Yes," said Fedya.

Tad had conquered the twinge of nausea that had distracted him. He turned and came back to stand behind Fedya, looking into the screen and visible therefore to Bill Ward back at Mission Control. A flicker of Bill's eyelids a moment later, could have betrayed the fact that Bill had noticed his reappearance; but the Mission Director made no comment about it.

"All right," Bill went on. "It seems to us that the possibilities add up like this. There're two practical choices. One, both craft can continue on the mission together coasting to orbit around Mars. However, with only two main engines on her shuttle module, *Phoenix Two* will not be able to depart Mars orbit; so at the time of departure all personnel will have to shift themselves and necessary supplies aboard *Phoenix One,* to return in a single ship."

He paused, glancing out of the screen at them.

"Go on," said Tad, harshly.

"Two," continued Bill, after the time lag had brought Tad's words to him. "We'll compute retro-fire figures now for *Phoenix One;* and the crews of both ships will move aboard her, abandoning *Phoenix Two. Phoenix One* then fires to an Earth-reinjection orbit, aborting the mission."

He paused again.

"That's pretty much what we'd figured out for ourselves," said Fedya.

"I suppose," said Bill, a little grimly. "Very well, here it is, then. There's a lot of public interest back here in seeing the mission completed; and I don't have to guess what you all would prefer to do. But here at Mission Control we have to think in terms of a whole space program, not just one mission. Frankly, we'd be tempted to risk your continuing on toward Mars if it weren't for two things. One, you've got a man aboard who needs medical attention. And two, you aren't able to redock the ships together. We found out with the Spacelabs how important some sort

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of substitute gravity is for the human body in space for any length of time; and you've got most of three years yet to go. Exercises may help, but we don't want to count on them on a mission like this. So—I'm sorry, gentlemen—but the decision of Mission Control is that the present situation calls for an abort. If you'll start making ready to have everyone aboard *Phoenix One* at firing time, we'll start working up the figures for your burn to an injection orbit that will bring you to rendezvous with Earth in about thirteen days."

He paused again. But this time only for a second, before proceeding.

"How soon do you think you can be ready to fire *Phoenix One?"* he asked.

Fedya started to speak, but Tad put a hand on Fedya's shoulder.

"Hold it a minute," said Tad.

He moved forward, pushing Fedya lightly aside; and the other man moved, vacating the seat in front of the console. Tad sat down.

"Bill," he said, "it's not going to be that easy. *Phoenix One* isn't going to be able to make it back to Earth orbit without some help from *Phoenix Two* while she's firing."

The pause between speech and answer, imposed by the distance between them, delayed Bill's visible reaction to these words. When he did react, it was with a sudden stiffening of his features. His lips moved.

"Can't?" he said, finally. "Why not?"

"Phoenix One," said Tad, "can't make it without *Phoenix Two* to tell her how to get there because when I was EVA on duty about a week and a half ago, I was checking the control leads from the mission module to the shuttle module. I'd gone in through Hatch Four; and I took the shielding off the leads for the check. The shielding floated away and I was so woozy from lack of sleep that I forgot all about the chance of a solar storm and didn't make a hard enough try to catch it. So those connections went unshielded during the storm. I sneaked down and checked them yesterday before I was supposed to be up and around; and while all five engines on the shuttle module here on *Phoenix One* still respond to controls, there's just one deficiency. The steering engine—the movable jet in the center of the fixed ones—won't lock in position during a burn. If we have to burn those engines, that steering nozzle is going to creep out of proper alignment and we'll curve off course.

"That means that the only safe way to get *Phoenix One* back to Earth orbit isn't with one long burn, but with a number of small burns, each one corrected for the creeping of the steering nozzle on the previous burn until a correct velocity and direction can be built up."

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He paused and took a breath.

"You see what it means," he said. "We may need five or six burns. Mission Control will have to figure a fresh position for *Phoenix One* after each burn and give a corrected figure for the next burn. And the only way that information for each new burn can reach *Phoenix One,* is through the LCO on *Phoenix Two* and then from *Phoenix Two* by radio to *Phoenix One."*

Bill sat motionless in the screen—for a longer time than the delay in transmission alone would have required. When he did speak again, his voice came heavily on their ears, saying only what was in all their minds.

"Phoenix Two can't fire to an Earth reinjection orbit with only two shuttle engines."

"That's right," said Tad. "You'll need one man aboard her when *Phoenix One* is firing, to relay information from Mission Control . . . me."

Bill's face stared at him from the screen. Behind Tad, none of the others said anything; but there was a feeling of negation from them that he could feel like a static discharge against the short hairs remaining at the back of his head.

"You're sick," said Bill, after a moment. "You're not fit—even if we were considering something like that."

"I'm fit enough," said Tad. "But I'm the most expendable. I got a real dose during that storm. But there's more than that. There's a gamble to it. I'm a real spacecraft pilot—the only one on board besides Fedya. I can fire those two shuttle engines into as close to an Earth-injection orbit as possible. Maybe close enough so that some support shuttles can come out and find me, in time. Nobody else but Fedya could make the most of that chance; and you'll want him in *Phoenix One* to see that the majority of the crew gets home safely—particularly with that unreliable steering engine."

Bill still sat, staring out from the screen at them. Finally he sat forward.

"I can't agree to anything like that," he said.

"Of course you can't," said Tad. "But go back and talk it over there at Mission Control. Then let us know. I'm not worried. There's only one way you can decide; because you've got an obligation to save as many of the mission crew as you can. So, talk it over and decide. Only, don't take too long. I'm in fine shape now, as I say, but I may not last forever."

He stopped speaking. Bill, however, still stayed where he was.

"Over and out," said Tad.

Bill stirred himself.

"Over and out," he echoed heavily.

The screen went blank. Tad leaned back in his console seat, slumping a little.

"You are a liar," said the voice

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of Bap behind him. "You feel much worse than you pretend, Tad."

"Go to hell," said Tad gently, without turning around. For a moment, geared up by his talk with Bill, he had forgotten how his body felt. But now the feeling of malaise came back on him. He closed his eyes, letting the sickness run loose about his body and limbs. "Go to hell, all of you. It's on the ground, they'll decide; and, as I said, they've got no choice."

"All the same," said Anoshi. "I'm going to check on that steering motor, right now; and see if it's crippled the way you say."

"Go ahead," said Tad. "You'll find it to be as I said. But look if you want. It won't make any difference."

The phone rang in the darkness.

For a moment Jen merely lay on his bed listening to it. He had been dreaming—about what he could not remember, some sort of semi-unpleasant dream of struggling with some duty in which other people would not cooperate—and for a moment, still wrapped in the shreds of the dream, he confused the sound of the phone with the imaginary situation he had just left.

Then he came fully awake and reached out for the instrument through the dark, fumbling for the *on* button, finally finding and punching it.

The screen sprang to colorful life and the image on it resolved into the face of Bill Ward.

"Mr. Wylie?" Bill said, squinting on the screen. "Have I reached Mr. Wylie? I can't see any image."

"You've reached me," said Jen, thickly. He struggled up on one elbow and punched on the bedside table light.

"There you are," said Bill. "I'm sorry to call you at four a.m. like this, but I've just been having a talk with the 'nauts on the LCO to *Phoenix Two;* and after that a long talk with our NASA people. They think I ought to talk directly to the President, myself, privately—and without anyone knowing that I've seen him. They don't trust the regular channels for getting in touch with him, and neither do I—"

He looked earnestly out of the screen into Jen's face.

"I didn't know who to go to but you," Bill said.

XV

The motors of the Vertical Takeoff and Landing Craft muttered on a bass note that set Jen's ears ringing, as the plane slowly sank level, and in a straight line like an elevator, from two thousand feet to the landing pad behind the White House. Rain drummed on the plane window beside Jen. The sky to the east was beginning to lighten with dawn.

They touched down and the door opened. Filing out, he and Bill

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were met by Warner Rethe, ducking under an umbrella held by somebody who was undoubtedly a White House security man.

"Come on!" said Warn.

He led the way at a trot to a side door of a building that might or might not have been a part of the White House structure—it was impossible to tell in the dark that was intensified by the glare of lights about the landing pad. A moment later they were indoors, walking down a narrow, but thickly carpeted, corridor.

The room they came into at last, two floors up, was a large and luxuriously furnished office. The President was on his feet, there, pacing up and down the room.

"Come in. Sit down." Fanzone pointed them to chairs as they came in. Jen and Warn took seats near Bill Ward.

"Listen, now," said Fanzone, turning to Bill Ward abruptly. "You did the right thing—when I say you, I mean all of you down there at the Cape. You did the right thing to come to me quietly this way. We can't let anyone know that the story you've told me came to me, alone, first. Let anyone who wants to guess as much as he wants. The point is, he mustn't know for certain. I want you and Jen here to go back to Florida, immediately. Warn?"

"Sir?"

"Is there still a plane out there for them to go back in?"

"It's standing by," said Warn.

"Good. Now, Bill, I want you to talk to the Marsnauts—privately. You can do that, can't you?"

"There's no way anyone can intercept laser communication," Bill said. "It's not like radio."

"Then talk to them. Don't tell them you've seen me, or talked to me. Just say you passed the matter on to your superiors in the Space Agency; and what you've got to tell them isn't official, it's just your own conclusions after passing the word along. Tell them they've got to wait until the governments participating in the Mars mission are at least notified; and they may have to wait for some agreement among them. Tell them we'll do our best to get an answer to them right away; but they have to expect it'll be three or four days at least before that answer comes. Can you do that?"

"Yes, sir," said Bill. "Only—"

"Never mind anything else," Fanzone said. "You do it, just as I said. And you, Jen!"

"Yes, sir?" said Jen.

"You're going to need some more authority than you've had up until now," Fanzone said. "I want you, as soon as you get back, to do two things. One, is to get the Deputy Ministers of Science for the various other countries together with you and say that I asked you, personally, to speak to them privately, and brief them on the whole situation. Then do it—don't hold back any information about

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the 'nauts or the mission; but don't hint that anything more has happened between you and me, except that I called you early this morning and asked you to talk to them. You can do that?"

"Yes," said Jen.

"The second thing I want you to do is after—note, *after* you've given the complete story to the Deputy Ministers and they've had an hour or two to contact their governments—hold a press conference. You can handle a press conference on your own, of course? Can't he, Warn?"

"Yes, sir. He can," Warn said.

"Again, you tell the press nothing about the White House in connection with this, except that it was suggested you were the one to break the news to the world, as our government's formal representative on the spot. You tell them what there is to tell about the 'nauts and their situation, except what you've been told not to tell. Warn will call you shortly after you're back down in Florida, and let you know what we don't want given to the press right now. That's all—except after both the Deputy Ministers' meeting and the press conference, you call Warn on scramble circuit and give him a report of what the reactions were. Is all that understood, now?"

"Yes, Mr. President," said Jen.

"Fine. Warn, take them back to their plane, now." The three other men rose and started to the door. "And, Warn—"

"Yes, sir?" Warn stopped and turned.

"As soon as they're off, get back up here," said Fanzone. "We're going to have to throw today's schedule into the wastebasket and make up one that's altogether different."

Bill Ward sat hunched before the LCO screen, talking to Tad, out on *Phoenix One.*

"The foreign representatives—those Deputy Ministers of Science—got briefed this morning by Jen Wylie," Bill said. "Wylie also had a press conference for the newspeople to pass the word to them, after lunch. So things are moving."

"Just so they keep moving," said Tad. "You said three or four days?"

"Yes. Maybe quicker, though."

"It needs to be quicker," said Tad. He no longer had any hair visible on his head as Bill viewed him in the LCO screen; and his face seemed to have fallen in until he had almost a skull-like look that the bald head reinforced.

"By the way," said Bill. "How're you feeling?"

"Fine," said Tad. "I'm just fine."

Jen Wylie sat in the sitting room of his hotel suite with copies of nearly a dozen newspapers in various languages, spread out on the rug in front of his chair. He had done his best; but the headlines, as usual, had gone for the worst.

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DISASTER HITS MARS MISSION read the one next to his right toe. SPACECRAFT BOTH FAIL, read the next nearest one . . . and so on from around the world in various tongues.

Maybe in its own way, it was a good thing—this jumping to announce tragedy. Then, if they managed to save five of the six 'nauts . . .

But no matter what course events took, sooner or later would come the witch-hunters, looking for Tad or someone else to blame for the failure of artificially high hopes.

Masaharu Tatsukichi, the Japanese Deputy Minister of Science, sat talking to Anoshi. All the Deputy Ministers had asked to speak to the 'nauts from their own country; and although on *Phoenix One* and *Two* they were still busy transferring repair parts, short interviews had been set up. Guenther had already talked to Bern, and Mahadev to Bap.

"Regrettable," said Masaharu to Anoshi, now, "that such high hopes should end in tragedy."

"Regrettable for all," replied Anoshi.

"Of course," said Masaharu, "but I have been aware of your own strong desire to accomplish the completed mission; and so I offer my sympathy on a personal level."

"I deeply appreciate," said Anoshi. "Personal regrets, however, are nothing when weighed in the balance against the greater loss . . ."

Varisov spoke to Fedya.

". . . All that can be done on both ships is being done, then?" Varisov asked.

"Yes," said Fedya.

Varisov leaned forward to examine Fedya's image in the screen more closely: and his tone gentled.

"My boy," he said, "you look thin. Quite thin and pale. You haven't been exposed to anything like radiation yourself, have you?"

"No," said Fedya. "I am only tired. As we all are . . ."

Tad floated half-asleep in a sort of fog of discomfort. He was too exhausted to stay awake but physically too miserable to fall completely into slumber. Vague thoughts and half-dreams chased themselves through his head. Most of the repairs that could be made on the two ships had been made. This was already the fourth day since he had last spoken to Bill Ward; and still there was no word from Mission Control to go ahead. Jen, whom he had spoken to last when the Deputy Ministers were all being allowed to speak to the Marsnaut of their own nationality, had fumbled, answering Tad's direct question as to why there should be any delay at all.

". . . Each government wants to make sure it doesn't lose face," Jen had said. "Each wants to make

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sure it isn't putting itself in a position where the others can blame or attack it in any way—"

"What happened to us had nothing to do with governments!" Tad snapped. "It was an overloaded schedule and a solar storm!"

"I know," said Jen, unhappily, "but the first instinct of political thinking when an emergency comes up is that you try to do nothing, for fear of doing the wrong thing. You sit back and let somebody else make the first mistake . . ."

But, thought Tad, drifting in his mist of discomfort, *Phoenix One* and *Two* could not wait forever. He, for one, could not wait; and even the ships, themselves . . . something else could break down on either one or both of them as a result of the primary damage from the storm; and not even *Phoenix One* would be able to make it back—

He roused to recognize the figure of Bap, which had loomed up in the darkness by his bed. Bap was smiling and carrying a syringe.

"Something new the docs down at Mission Control just suggested to keep you perky," Bap said.

"What is it . . ." Tad started to ask; but Bap was already giving him the shot and it really did not matter. Whatever it was, it worked quickly. The needle had hardly been withdrawn from his arm before the sickness trembling all through his body and limbs began to diminish. The feeling of malaise faded; and his overwhelming tiredness claimed him.

"Working," he mumbled to Bap, who still stood by the bed, "working fine. That's good. I'll need my rest."

"Yes, you will," said Bap.

Bap continued to stand by the bed until Tad's breathing became slow and deep. Then he went back out and up the access tube to A Deck. Anoshi was there, with Fedya, Dirk and Bern.

"He's asleep," Bap said, as he came out of the access tube hatch. "It's fairly short-action, though. He shouldn't be out more than three or four hours."

"Good," said Fedya. "I'll get going, then."

He started to get into his spacesuit, which was waiting on the deck. Dirk and Bern helped him into it.

"What if Mission Control just delays in giving you the figures for our first burn?" Bap asked.

"Then you'll make the first burn on our own figures," Fedya said, "and I say that to you as an order, since I'm in command, now."

"Yes, sir," said Bap. But the smile that went with his words, faded almost immediately. Bern and Dirk were fitting on Fedya's helmet now. As soon as they were done and had stepped back, Bap held out his hand.

The gloved hand of Fedya took and shook it. They did not say any-

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thing. Turning slowly and clumsily about in a near circle, Fedya shook hands in turn with Anoshi, Bern and Dirk. Then he turned and left them, pulling himself into the access tube and along the tube to the air lock at the end of it leading to Hatch Three.

He emerged from Hatch Three into the unchanging lights and dark of space. The propulsion pack was already in place on his shoulders; but this time he would not have to rely on it alone to cross the void between him and *Phoenix Two.* He reached for a meter-long tether connected to the tool belt around the waist of his suit, and clipped the metal loop at the free end of it over the wire that now connected the two ships. Pushing off from the hull of *Phoenix One,* he activated the propulsion pack and slid along the line of the wire toward the other spacecraft.

At the far end, he detached his tether. He reached to release the wire where it was wound around the bit on the hull of *Phoenix Two,* then changed his mind. With the inertia of *Phoenix Two* to hold it in place, the first thrust of the *Phoenix One* engines would snap the wire like a thread. He went down alone into the A Deck of *Phoenix Two* and took off his suit.

He sat down at his control console and sent a call on the LCO to Mission Control.

"There's been a slight change in plans, here," Fedya said to Al Ciro, who answered. "We can't wait any longer to start *Phoenix* toward Earth; and we will start with our own figures for the first burn unless we get others from you in four hours' time."

"Just a minute!" said Al. "This is all over my head. Bill Ward's at home. Let me get him here to talk to you."

Fedya shook his head.

"There's nothing to talk about," he said. "We're not asking Mission Control for permission to move. We're telling Mission Control that we are moving. We'll be following the plan outlined by Tad in which one man stays aboard *Phoenix Two* to handle transmission of data to *Phoenix One,* while the other five travel in *Phoenix One.* The only change will be in the places of the pilots. Tad will pilot *Phoenix One.* I will stay aboard *Phoenix Two."*

"Wait," said Al. *"Phoenix Two,* wait. Let me talk to Tad."

"You cannot talk to Tad," said Fedya. "He's resting before the work of bringing *Phoenix One* in. In any case, he is no longer in command of the mission. Because of his illness, he has been relieved of his command; and I, as second officer, have taken over."

Al stared out of the screen at Fedya.

"I'll get Bill Ward," he said, finally.

"By all means," said Fedya. "Get anyone you like. But also get us the figures for the first burn in four

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hours or we will proceed on our own."

XVI

Tad woke from the deepest sleep he had had in some days to find Bap shaking him.

"What is it?" he asked, thickly.

"I'm sorry, Tad," said Bap, "but you'll have to get up now. Fedya's taken command of the mission and he's staying aboard *Phoenix Two,* alone. You and I, and Anoshi, Dirk, and Bern are all here on *Phoenix One."*

Tad stared up at him blearily.

"Taken . . ." he muttered. "No, he can't."

"He has, though," said Bap. "He left this tape for you. Listen."

Bap reached out and pushed the playback button at the base of the phone by Tad's bed. There was a second of silence; and then Fedya's voice, speaking in the room.

"Forgive me, Tad," it said. "You did very well at hiding the way you've been feeling; but we all know you too well. It was plain that you are less strong and more sick than you wished us to think. But time is running out without the go-ahead from Mission Control and we—both of us, you and I—have to think of the mission first and the chance of saving the larger part of the crews. It's true that handling *Phoenix One* down through a series of burns needs a man with your experience. But in a pinch, Anoshi or one of the others could at least attempt it, and probably get close enough to Earth orbit to be found by shuttles sent out to find you. But what if you were alone on *Phoenix Two,* and your illness got to the point where you could not transmit the necessary information from Mission Control on to *Phoenix One?"*

There was a pause in the tape. The Fedya's voice took up again.

"You see, Tad," he said, "the mission cannot afford to have anyone but a well man on the LCO of *Phoenix Two.* Forgive me, as I say—and believe me. I would not have taken this from you for any lesser reason than the good of the greatest number."

"Damn his eyes!" mumbled Tad. Then, slowly he shook his head. "No, I take that back. It's true. He wouldn't have, either."

"Wouldn't have what?" asked Bap, looking down at him with strange curiosity.

"Get me upstairs. Get me to A Deck," said Tad, trying to stand up. Bap caught his arm and helped him to his feet. "I suspected something like this might happen. Has Mission Control given us the word to go and the first burn figures?"

"Yes," said Bap, helping him out of the room and through the hatch into the access tube. "Fedya told them that if we didn't have burn figures from them in four hours, we'd go on our own figures. They just sent their figures through.

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There's a permanent patch from the *Phoenix Two* LCO to its radio. We pick up everything that Mission Control sends him, by voice, as well as what Fedya says to us . . ."

All the time Bap was talking, he was assisting and guiding Tad up the tube and out onto A Deck. Tad dropped at last heavily into his usual seat, the acceleration couch in its chair position before the control console.

He leaned toward the console, lifted his hand toward its controls, then dropped it again, leaning back in his seat.

"Bap," he said. "I need something. You must have some kind of stimulant among those drugs of yours."

"You don't want anything like that," said Bap. "It'd give you a lift for a short while, but then you'd feel even worse."

"Get it for me," Tad said.

"Tad, listen to me—"

"Get it for me," repeated Tad. "I'm no good this way. Give me something to get my motor started turning over; and maybe I can keep it going, myself."

Bap turned and went off. He came back with a little yellow pill and a glass of water. Tad washed the pill down his throat and lay back, panting.

After a few minutes, his panting slowed and, with an effort, he sat up to the controls again. He punched communications.

"Fedya—" he said. "*Phoenix One* to *Phoenix Two.*"

"I'm right here, Tad," Fedya's voice came back immediately. "And, as I said to you on the tape. Forgive me."

"Nothing," said Tad, rubbing the back of his hand across his dry lips. "You did the right thing. You and I know why it's really right. I wouldn't have lasted. Bap said Mission Control had already sent through the burn figures."

"You've got them on printout in the console before you," Fedya said.

Tad looked down and punched for course data printout. A tongue of paper darkened with figures marched slowly out of the slot into his hands. He tore it off and studied it. After a few minutes he raised his head. He was sitting a little straighter now as the stimulant took hold; and his eyes were brighter.

"Fedya," he said, "let me talk to Mission Control."

"We're right here, too, *Phoenix One,*" answered Bill Ward's voice after a short pause. "Fedya has us patched in on his radio to you."

"Is this all there is to the first burn?" Tad asked. "These figures?"

"That's right," said Bill. "Fedya's got his own set, of course, for all the burn he can get at once, since he's only going to have one chance to get as much course change and velocity as he can before those two motors burn out. But what we

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thought would be best for *Phoenix One* would be to space out a number of small burns at first, to see if we couldn't figure out some kind of pattern to the way that steering engine of yours will creep. If we can figure out a pattern, then we can try to allow for it in the later burns at the same time as we're trying to straighten out your course."

"Good." Tad nodded.

"Let us know how it feels to you while the burn's on."

"Right," said Tad.

"Then let us know when you're ready to go," said Bill. "We'll give you a firing time and an update of the figures to that moment."

"Let's get settled here, first," said Tad. He turned to look around at the other four men. "Bap and Anoshi, you'd better take your seats in couch position. Dirk, Bern—you two had better head down to B Deck and take a bed apiece, there. This isn't going to be much of a burn; but there's no point in taking chances."

Bern and Dirk disappeared into the access tube as Anoshi and Bap took their control seats, laying them back into the couch position.

"How about it, down on B Deck," said Tad after a couple of minutes. "Are you both tucked in, down there?"

"Tucked in nicely, Mother," said Dirk.

"I am in," said Bern.

"All right, Mission Control," said Tad. "We're ready here for that firing time, now, and that update of the figures."

He reached out to press the printout button, and a new piece of paper worked its way out from the slot into his hand.

"Firing time five minutes," said the speaker on the console in a Mission Control voice. "Four minutes, fifty-nine seconds and counting . . . four minutes, fifty seconds and counting . . . four minutes, forty seconds . . ."

Tad was punching the information from the latest printout into his engine controls.

". . . One minute," said the speaker. ". . . Fifty-nine seconds . . . fifty-eight seconds . . ."

Tad completed his preparations.

"All set, Mission Control," he said.

". . . Three . . . two . . . one. Fire!"

"Fire!" echoed Tad, pressing the firing button. Aboard *Phoenix One* vibration and sudden weight took them all for the first time since she had been lifted from Earth orbit by the two auxiliary shuttles that later parted from her.

But this was only a lesser and shorter version of the three-gravity thrust that the spacecraft had felt at that time. The firing was over, it seemed to Tad, almost before it had begun. But he had felt—he was positive he had felt—the direction of the change of angle of thrust as the steering motor crept off course

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even in that short time. He began checking his instruments eagerly, to see what they could tell him about the error which the steering jet's movement must have caused.

"Phoenix Two! Phoenix Two, this is Mission Control!" the radio speaker was saying. "Fedya, we were in communication all through that firing period and we're in communication now as far as we can tell. Come in, Fedya!"

"Phoenix Two," said Fedya's voice. "We're in communication."

"What happened, *Phoenix Two?* Didn't you fire? If you'd moved we'd be out of communication now until the LCO could realign between us."

"No," said Fedya; and Tad stopped checking his instruments, abruptly, to listen. "I didn't fire. There seems to be some malfunction in the controls. It doesn't look serious. I'll get down and check it. I can fire any time, of course."

"We'll give you an update on your own figures, to the next firing time of *Phoenix One,"* said Mission Control. "Let us know about that malfunction as soon as you establish what it is."

"Will do," said Fedya.

"Good. *Phoenix One. Phoenix One,* this is Mission Control. How did the burn go with you?"

"Fine," said Tad. "There was a creep, all right. I'll let you know as soon as I get what information I have on it. When's our next firing time?"

"As soon as we pinpoint your present position," said Mission Control, "and decide on the details of the next burn. Estimate, twelve to sixteen hours. Without the LCO on *Phoenix Two* alongside you, we're going to have to hunt for you."

"Good hunting," said Tad.

He leaned back on the acceleration couch exhaustedly. He had meant to make some more energetic answer, perhaps some joke about little black sheep who had lost their way; but he did not have the energy. The effect of the yellow pill was wearing off.

"You understand," said Vassily Zacharin, "we must ask for a thorough examination and explanation of this."

Vassily Zacharin was the Soviet Ambassador to the United States of America. He and Varisov sat now in the office of Paul Fanzone; and Paul Fanzone himself, sitting behind his desk with Warn Rethe standing behind him, nodded agreeably.

"I do understand," said Fanzone, gently. "Of course. I've had calls made on me today by several representatives of the other powers involved with us in this space effort. Of course it's a great shock to us all, that a mission that meant so much to the world should find itself frustrated in this tragic way."

"It's true, Mr. President," said Vassily, "that we are very con-

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cerned with the failure of the Mars mission itself. But more important to my government and the Soviet peoples is an answer to the question of why Feodor Aleksandrovitch Asturnov should be the one of six Marsnauts to give his life that the others may live."

"He hasn't given it yet," said Fanzone, a little dryly.

"We understand," said Vassily, "that the chances of his bringing *Phoenix Two* close enough to Earth to be found and rescued are so small as to hardly be worth computing. You understand me, Mr. President, Feodor Aleksandrovitch is a brave man and we do not doubt that he would hesitate to offer to help his comrades even at the cost of his almost certain death. It is simply that we understand your Marsnaut Tadell Hansard first informed Mission Control that he was to be the one to stay on *Phoenix Two,* since he was already dying from a lethal exposure to radiation—"

"Tadell Hansard isn't dead yet, either," said Fanzone. "And our doctors say no one will know whether he had a lethal dose or not until they get him back here and examine him."

"Undoubtedly," said Vassily. "It is expected that physicians wish to make absolutely certain before making any pronouncement. But your doctors, like ours, like those of the rest of the world, can hardly avoid interpreting the information of Colonel Hansard's steady deterioration as pointing to anything but one overwhelming probability. In short, few people qualified to interpret the symptoms doubt that he is a dying man. The question therefore arises in the minds of the people of the world—not just in the Soviet Republics—why a dying man is being brought back to Earth, while a completely well man throws his life away in the dying man's place."

"I can't really answer that question any better than anyone else, including yourselves," said Fanzone. "Your Marsnaut has told us that he took over command from Tad Hansard and made the change of ships between the two of them on his own authority. We have the tape of his telling Mission Control so; and I believe you've heard it played. Presumably you understand one of your own nationals better than we do. Perhaps you can tell me why he did it."

"We have no idea, of course, Mr. President," said Vassily, the even tenor of his voice almost monotonously unchanging. "We only point out that the question exists; and that since it was the Marsnaut of your country that was favored at the expense of ours, we would like to be satisfied that the urgency to discover an explanation—a thoroughly impartial explanation, without partisanship toward any member of the mission—burns as strongly in the minds of your

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people as it does in ours."

"You can be certain of that," said Fanzone. "We would very much like to know why Colonel Asturnov deposed the established senior commander of the mission without authority. Also, why he took matters into his own hands, even to the point of threatening to risk the lives of other members of the mission on a burn from incomplete data, unless Mission Control gave him the complete data."

Vassily paused.

"I'm sure, Mr. President," he said after a second, "you do not mean to imply some sort of accusation against Colonel Asturnov?"

"Of course not," said Fanzone. "We are just, like your government and people, very desirous of finding out just what caused things to happen as they have. I think all of the world's people who supplied 'nauts to this mission have a common interest in that."

"I agree with you," said Vassily, inclining his head.

"Then we'll all look forward to getting the *Phoenix One* and *Two* back, so we can satisfy our interest," said Fanzone, briskly.

"Yes indeed, Mr. President. You've been most kind. If you'll excuse us, then?" Vassily raised his eyebrows.

"Very good of you and Deputy Minister Varisov to come and see us," said Fanzone, rising behind the desk. Vassily and Varisov were also on their feet.

"I will be informing my government immediately about your equal interest in this matter," said Vassily.

"Thank you. Good afternoon," said Fanzone.

"Good afternoon, Mr. President."

The two men went out. Fanzone, still standing, turned and looked at Warn Rethe, who came forward.

"Now the rock-throwing starts," said Fanzone. "The public is hungry, Warn. Not just our public, but the public all over the world. The hope they all had for the mission as a symbol of world cooperation was just too damn high. Someone's going to have to be hung at high noon for this, or governments all over the world are going to be shaken up. Any idea who could fill the role of scapegoat, Warn?"

"No, sir," said Warn. He looked at Fanzone curiously, and added, "Do you?"

"Of course," said Fanzone, grimly. "The 'nauts, themselves. Nothing or no one else is big enough now to feed the wolves."

"*Phoenix One,* ready for your fourth burn?" asked Mission Control.

"Ready," said Tad, coming awake in the control seat with a snap. Now, after three burns and more than six days, he had become conditioned to the sound of the voice of Mission Control over the speaker. Since that first burn he had not needed again the stimulant

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he had demanded that Bap supply him. At the word that a burn was imminent, his body chemistry leaped by itself into high gear, depressing for the moment actual vomiting and diarrhea, but the feelings of nausea and spasm and the half-unreal sensation of waking dreams made him doubt at times that he was actually seated at the control console on the *Phoenix One.* There were times when he could have sworn he was back at home, doing some painting on the house, or at the beach with Wendy and the children.

"*Phoenix Two,* how about you?" Mission Control was demanding. "Are you ready to fire this time?"

"I am afraid not," Fedya's voice said. Six days plus had separated the two spacecraft enough so that a little static washed out his words, now and then. "I haven't been able to track down the trouble, yet; but I should find it soon. I'm not going away, Mission Control. I will have my chance to fire, later."

"Better sooner than later, *Phoenix Two,*" said Mission Control. "See if you can't find it before next firing. *Phoenix One,* have you got your figures for the burn?"

"I'll read them back to you," said Tad. Since the first burn when *Phoenix One* had still been in wired connection with *Phoenix Two,* a printout of the burn figures had been impossible. The only way they could be transmitted to Tad was for Mission Control to read them to him orally over the radio patch from *Phoenix Two;* and the only check on the accuracy of their transmission was to have Tad read them back.

He began to read.

XVII

"Well, *Phoenix One,*" said Mission Control, "I think we may have some good news for you."

Tad woke with a start—came back from some strange delirious dream, the details of which evaporated even as he tried to remember them.

"What—" he started to say; but the word was only a dry husk of a sound in his throat. He tried to clear his throat, but it would not clear. A hand offered him a cup of water and he took it gratefully. It was Anoshi standing over him and offering him the water. There was always one of the others with him on A Deck, now, when he was at the control console.

The water moistened his throat, and he could speak aloud.

"What day is this?" he asked Anoshi. "How many burns so far?"

"Tenth day," Anoshi said. "Seventh burn coming up."

"Did you hear me, *Phoenix One?*" Mission Control said. Relayed from the now-distant *Phoenix Two,* the radio was thin and scratchy with static. "I was saying we may have some good news for you, after all."

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"I hear you," said Tad to the mike grid. "What is it?"

"Well, for one thing, you're getting close. We're starting to pick up that radio signal of yours. We can't understand you on radio, yet, but we're beginning to bring you in. We'll be talking directly to you, soon as we can get a real directional fix on you." Mission Control paused. "That's one thing. The other thing is, we think we've got the pattern of that creep in your steering motor figured out; so we can correct for it in the next burn. If we're right, it won't take more than one or two more burns to bring you home."

Tad nodded. It did not occur to him to answer, until Anoshi leaned forward to the mike grid.

"That's wonderful, Mission Control," said Anoshi, "you're wonderful."

"Thank you, *Phoenix One.* The compliment is returned—is this someone else speaking?"

"This is Anoshi, Tad just had a frog in his throat for a minute."

"I'm all right now, Mission Control," said Tad. "You've got some burn figures for us, then?"

"That's right," said Mission Control. "Got them for *Phoenix Two,* as well. You're going to go this time, aren't you, *Phoenix Two*?"

There was a definite pause now, before radio waves brought Fedya's answer to the speaker of the console on *Phoenix One,* and Fedya's voice, like Mission Control's, was now dimmed by distance and static.

"Is this my last chance, Mission Control?"

"Either your last, or your next-to-last, *Phoenix Two.*"

"Do not worry, then," said Fedya. "This time I'll fire."

"All right, then, *Phoenix One* and *Two.* Here's your data . . ."

Jen punched out a number on the phone with great energy.

"Hello," he said, when he got it, "Barney Winstrom, please. Yes, would you page him? I'll hold."

"Jen," said Lin, behind him, "are you sure you want to do this?"

"Very sure," said Jen. "I should have done something like this a long time ago. I would have if I'd been thinking straight. I can blow this thing wide open."

"But are you sure you need to?" Lin said. "You can't be positive that there's any plan to blame everything on the mission crews—"

"Barney?" said Jen into the telephone. "Jen. Look, I want you to do something for me. But first, will you answer a question for me?"

"Glad to, if I can," Barney frowned a little in the phone screen. "What's the question?"

"If you had to make a bet on who's going to catch the largest share of official blame, once they start investigating the accidents on the Mars mission, who would you bet would be the goats?" said Jen.

"From the sounds in the woodwork, already," said Barney, "the

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'nauts, themselves." Barney peered forward on the screen, as if trying to see around Jen to Lin. "Understand, that's not what I think. I'm just giving you a reading on what I hear, and smell in the wind. There's been too much fuss all around the world for this to happen without someone having to take the blame."

"You see," said Jen, glancing over his shoulder at Lin, "it doesn't take planning–just a few voices going for the same target. Look, Barney," he transferred his gaze back to the phone screen, "I'm going to hold a press conference. Just like I did by Presidential request, right after word came of what the radiation had done to Tad and the ships. But I'm doing this one on my own hook; so I'm calling it for two hours from now so they won't have time to stop me. And I don't want to announce it officially for the same reason. Would you get on the phone and start spreading the word to the newspeople?"

"What's the subject? And where'll the conference be?"

"Subject's a secret," said Jen. "And it'll be held in that ballroom at the official hotel where I'm staying–you know the one with the balconies they've kept for press conferences. It'll be held there–" Jen glanced at his watch, "at three o'clock sharp, whether there's anything else going on in that room then or not. If necessary, I'll just walk to the stage and take over the mike. Will you spread the word for me, now?"

Barney gazed at him.

"How do you feel?" Barney asked.

"Better than I've felt in days."

"All right," said Barney. "It can't hurt me, anyway. I'll just pass on the rumor I heard."

"Fine. So long," said Jen.

"See you there," said Barney, and punched off.

Jen punched a new set of numbers on the phone.

"Merritt Island Hotel, manager's office," said the face of a young man appearing on the screen. "Oh, Mr. Wylie."

"Could I speak to the manager?"

"Yes, sir. One moment."

The screen went blank for a moment, then sprang into color with the image of a gray-haired, smiling woman.

"Yes, Mr. Wylie?"

"It looks as if I'm going to have to call a press conference on short notice," Jen said. "Do you know if that ballroom of yours is available?"

"Let me see . . ." She glanced aside. "Yes, Mr. Wylie, it is. Any special requirements?"

"No. Just have the doors unlocked as soon as possible," said Jen. "I've set the time at three o'clock–this afternoon."

"Three? That soon?"

"Any problem about it?"

"Why . . . no. No, Mr. Wylie. None at all."

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"Good. Thank you," said Jen; and punched off.

He straightened up from the phone and got to his feet, to find Lin already on her feet, looking at him strangely.

"Now," he said, before she could speak, "I need a lawyer; and I don't know any down here. Did you know any lawyers back when your father was stationed here at Patrick Air Force Base?"

"Lawyer?" Lin looked puzzled. "Not really. We always used someone Dad knew in the Adjutant General's department when we had legal questions to ask."

"That's no good," said Jen. "A military lawyer won't help me. I need someone locally who's not afraid of tangling with the Federal government."

"Oh," said Lin. "Tom Haley. He's a friend of Dad's. A civilian lawyer."

"Not afraid—"

"Tom Haley likes tangling with the Federal government, or anyone else," said Lin firmly.

"Will you call him and introduce me?"

"I . . . can, of course," said Lin. "But what are you going to tell him? What are you going to tell those newspeople at the press conference?"

"The truth about the mission and whose fault it is things went wrong, and how they can prove for themselves I'm telling the truth. Once I do that, of course, I'm going to find myself under Federal arrest, for violation of the National Security Act and Espionage Law. I'll need a lawyer."

She looked at him a long moment, then walked past him to the phone.

"I'll get Tom on the line," she said.

Jen, Lin, and Tom Haley—a tall, powerful, cheerful man with white hair cut to a one-inch stubble—came into the ballroom just before three p.m., and walked down the side of the room to the speakers' stand with its long table and pencil microphones. The ranks of folding chairs that filled the expanse of ballroom floor had only a sprinkling of people in them; but more were coming in.

"Well, well," said Tom Haley, looking them over, "not much of a gathering to hear a man accuse the leading governments of the world. Are you sure you're going to need me, Jen? I could have stayed at my office and got part-way caught up on my work."

"There may not be many of them here," said Jen, "but the ones that are here have large ears; and their papers or stations or networks have large mouths. I'll need you all right."

He went toward the center of the table.

"Aren't you going to wait?" Lin asked. "There's a stream of people in every aisle, still coming in."

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"Maybe you're right," said Jen. Then, abruptly, he started toward the chair at the center of the table. "No. See that gray-haired woman coming down the side aisle? She's the day manager of the hotel. Tom, will you try to stall her as long as you can?"

Tom turned, followed by Lin, and went toward that end of the platform that met the bottom of the side aisle Jen had indicated. Jen seated himself at the table, tapped the pencil microphone before him to make sure it was working, and spoke.

"Sorry to start while some of you are still coming in," he said. "But my time may be limited. As most of you may know, I'm Jen Wylie, U.S. Undersecretary of Science for the Development of Space; and a former newsman myself."

Out of the corner his eye could see that the hotel manager had reached the edge of the platform and was faced there by Tom and Lin, who were arguing with her.

"What I have to say won't take long in any case," he said, "because I'm not going to give you information so much as put you on the track of finding it for yourselves. As you know, the two spacecraft of the Mars mission have been disabled by a solar storm—Mission Control is trying to bring at least one of them back to Earth orbit right now. Also, Tad Hansard, one of the Marsnauts, has suffered some bad effects from radiation during the solar storm. Very soon now, investigations will be started into what factors were involved in the failure of the mission."

The manager was up on one corner of the stage, now, but her way was still being barred by Tom and Lin. Behind the manager, were a heavy middle-aged man wearing the uniform of a hotel guard and one of the Federal security men assigned to the Deputy Ministers, in civilian suit, coming down the aisle.

"There may be some voices raised to suggest that the cause of failure lay in the Marsnauts, themselves," he went on, rapidly. "In connection with that I want to suggest that you investigate the following possible chain of events. That the publics of the various nations and national groups involved in this mission competed against each other for the time and effort that the 'nauts would have to spare for scientific experimentation and testing on the mission. That the result of this competition was that the Marsnauts were given an experimental schedule too heavy for them to handle in the time available. That the 'nauts tried to handle this impossible work load, regardless, with the result that fatigue from overwork caused errors of judgment that led directly to the radiation damage to Tad Hansard and both ships.

"Finally, I would like you to investigate the fact that storage space aboard both ships intended for

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spare parts and equipment, now become necessary since the radiation storm both ships encountered, has in some cases been preempted for equipment belonging to the area of the experimental schedule. So that right at this moment both ships now lack repair facilities which should have been aboard them.

"The necessary information to check this is already in your hands, and in the hands of the public you inform. I suggest you check the bargraphs of the Marsnauts' schedules to establish whether the work required of them could reasonably be accomplished in the overall time available, unless all activities aboard the ship were miraculously free of any delay and time loss. I ask you to examine the reports so far released, of events on both *Phoenix One* and *Two;* and decide for yourselves and your readers whether it was the demands of the mission or the Marsnauts who are responsible for the failures. And now—" said Jen, hastily pushing back his chair, "I must go."

He rose and left by the far end of the stage, just as the security agent he had recognized pushed past a determined Lin and strode toward him. He leaped down into an aisle and ran toward the entrance to the ballroom.

To his surprise he made it. Looking back, he saw that the security agent had been entangled in a crowd of newspeople apparently eager to question him—and who in the process had trapped him to a standstill. Lin and Tom, now ignored, were coming up the other aisle, where a little earlier, the manager had gone down.

Jen ducked out the ballroom entrance and waited. After a minute or two, Lin and Tom came out and saw him.

"Better move while you can," said Tom.

They left the hotel for Tom's car, which was parked in the hotel parking lot outside.

"Where to?" the lawyer asked as they slipped out into the traffic of the street.

"Let's go back to my motel and think," said Lin. She looked at Jen. "We should have thought about it before you got up to talk."

But Jen was supremely happy.

"Doesn't matter," he said. "They'll catch up with me sooner or later. But meanwhile I might as well enjoy life."

"You'd better simmer down," said Lin.

"That's not bad advice," said Tom. His car was the largest model air-cushion vehicle being made for private use, and he slid it through the traffic with absent-minded skill. "Everyone who's come after you so far hasn't had any arrest powers. When someone like that actually shows up, though, all Lin and I are going to be able to do for you is advise you to go quietly."

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They came finally to the motel. The phone within was ringing as they pulled into the driveway beside the unit. Lin opened the door on her side of the car as Tom stopped the vehicle, and she ran into the motel room.

They followed and heard her talking to someone at the far end of the line.

"Yes, I'll be right out," she was saying. She punched off and turned to them. "Barney calling about Mission Control. They finally figured out the creeping of that steering engine on *Phoenix One*. The last burn put the ship right where they expected her to be. One more will bring them in—and they can talk directly to Tad by radio, now, without going through the LCO to *Phoenix Two!*"

"Thank God," said Jen.

"I'm going out there right away." Lin headed toward the door. "They just might give me an interview.

"I'll go with you—" Jen checked and looked back at Tom Haley. "That's right, you won't be able to go in with us. Wait, you can wear my press pass."

"I've got a press vehicle pass for our car and passengers," said Lin. "Unless they stop him inside the Flight Control building, he'll be all right."

"Do you want to go?" Jen asked him.

"I like to see things through," said Tom. "And as soon as word gets around you're there, somebody'll be tapping on your shoulder inside of fifteen minutes. I'll stick with you until dinner time."

"Good," said Jen.

They took Lin's rented car. The roads to the Cape were almost deserted in the brilliant, late afternoon sunlight. As Lin had said, the guard on the gate did not question Tom; and they pulled into the parking lot beside the Flight Control building. Inside, on the main floor, they hurried past another guard who was talking on the telephone in the lobby and did not see them pass.

The elevator took them up to the floor where the Flight Control Room was. But there was a third guard on duty at the door of the room and this time not only Tom, but Lin, was stopped.

"I'll try to get someone to phone security for Tom," said Jen, going in alone. Lin stayed with Tom.

Jen went into the glassed-in observation room, at the back of the sloping floor with its rows of consoles. Wendy Hansard was at one of them, apparently having just finished talking to Tad. A speaker inside the observation room sounded with Tad's voice, over a background of light static.

". . . give me a time check."

His voice sounded in Jen's ears as heavy, blurred and slow—like the voice of a man under drugs or just awakened.

"Time is four minutes, thirty-

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seven seconds to burn," answered a Mission Control voice. "four thirty-six . . . four thirty-five . . . four thirty-four . . ."

"Copy," said Tad's voice. "O.K. Our time checks. You've got a perceptible disk, seen from here."

"Glad to hear it," said Mission Control. "Are you all set with the figures for the final burn?"

"All set. All ready here. Just waiting it out," said Tad's voice, slowly.

"*Phoenix Two*, how about you?" asked Mission Control. The light sound of static ceased, but there was no other response. "*Phoenix Two*. Come in, *Phoenix Two*. We're not reading you."

There was a faint murmur that swelled up clearly and loudly, suddenly, with no static to be heard at all.

". . . said that the LCO here seems to be fading in and out on transmission for me," said Fedya's voice. "Can you read me now, Mission Control? Can you read me?"

"Roger. We read you now, *Phoenix Two*. We read you clear and loud," said Mission Control. "You were out there for a few minutes again, then you faded back in all of a sudden. Is your reception of us or of *Phoenix One* fading likewise?"

"No. No fade from you. I'm receiving *Phoenix One* now through you. Too much static on radio direct from Tad, now," said Fedya. "Let me know if I fade out again."

"Are you set for burn, *Phoenix Two?* Have you got your figures?"

"I have the figures. Thank you, Mission Control."

"Will you make the burn this time, all right, do you think?" There was a movement beside Jen, and he glanced aside briefly to see Tom, now with a badge, slip into the room beside him and stand listening. "If we lose contact with you through the LCO, we won't be able to keep updating your burn figures. You've got to go, this time."

"I intend to go," said the voice of Fedya. "Never mind me, Mission Control. Concentrate on getting *Phoenix One* home safe."

"What is it?" Tom asked Jen. For no readily obvious reason, he spoke in a whisper. "That business about his going?"

"He's been having trouble getting the two working engines he's got to burn at all," Jen said. "He hasn't been able to fire at the same time as *Phoenix One* on any of the burns since the two ships were together–"

He broke off. Mission Control was talking to Tad, again.

". . . Two shuttles," Mission Control was saying. "One will stand off when they meet you. The other will come close enough to get a line to your Number Three Hatch. We'll send a pilot across to bring *Phoenix One* in the rest of the way to orbit; and all of you will transfer over to the shuttle. Understood?"

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"Understood," said Tad. "How soon after we finish burn should we rendezvous?"

"The shuttle should meet you in four hours and ten minutes after you finish your burn," Mission Control said. "That's provided you end up where you're supposed to. The shuttles are already on the way to that point, as we told you earlier today."

"Copy," said Tad. "Four hours, ten minutes after end burn."

His voice was slowing down even more as he talked. Like a phonograph record slowing down.

"Tad," said Mission Control. "Tad, why don't you let Anoshi or one of the others take over for this last burn? It's all cut and dried, now."

"Hell with that . . ." Tad's voice slurred drunkenly. "Took her out—bring 'er back . . . Fedya!"

"I'm listening, Tad." Fedya's voice over the LCO was so clear, alert and free of background noise in comparison to Tad's that Jen almost started. It was almost as if Fedya had spoken behind Jen and Tom in the observation room.

"Good hunting, partner."

"Thank you . . . partner," said Fedya. "And I wish. . . ."

His voice faded once more, suddenly, into nothingness.

"Fedya?" said Tad, after a moment.

There was no answer.

"*Phoenix Two*'s LCO is malfunctioning," Mission Control said. "We don't receive Fedya either, Tad."

Tad's voice muttered something unintelligible.

"One minute and counting," said Mission Control. "Ready for countdown, *Phoenix One, Phoenix Two?* Fifty-six seconds . . . fifty-five . . . fifty-four . . ."

"You mean—" Tom Haley was whispering again in Jen's ear, "the other spaceship hasn't even started to come toward Earth?"

"Yes," said Jen. He was hardly listening. His attention was all on Wendy, standing by the console with her back turned to Jen's end of the room. Her arms were at her side, and her hands were clenched. There was no other sign of tension about her. Someone else came into the observation room behind Jen and Tom, but neither of them turned to look.

"Twenty seconds . . ." Mission Control was counting.

"GOOD LUCK, *PHOENIX ONE,*" said the voice of Fedya, suddenly loud in the observation room, drowning out the voice of Mission Control's counting.

"Six seconds . . . five seconds," said Mission Control. "Four . . . three . . . two . . . one . . . fire!"

A sudden roar of static erupted from the speaker, and was tuned down to silence. It was silent in the observation room. No one moved down in the Control Room proper. Jen and Tom waited, breathing shallow breaths.

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Finally, after a long time, the speaker came to life again with the faint background wash of static Jen had heard originally.

"*Phoenix One,*" said Mission Control. "Come in, *Phoenix One.*"

"Read you, Mission Control," answered Tad's voice suddenly. "All over. Burn went fine. Everything's fine."

"Roger, *Phoenix One,*" said Mission Control. "You are on target. Repeat, you are on target. We're just getting confirmation on that by the ATM in Skylab Two. Congratulations. The shuttles will be with you soon."

"Thanks to you, Mission Control," said Tad. "I thank you, we all thank you . . ."

"*Phoenix Two?*" said Mission Control. "*Phoenix Two,* come in. This is Mission Control calling *Phoenix Two.* Do you read me, *Phoenix Two?*"

"I read you, Mission Control." Fedya's voice swelled up in volume suddenly from the speaker. "Great good work, Tad. My congratulations to all of you."

"Salute to you, Fedya," said Tad.

"*Phoenix Two,* this is Mission Control. Did you accomplish burn? Repeat, did you accomplish burn this time."

"I am sorry, Mission Control," said Fedya. "Very sorry. No, I did not burn. But then I was not trying. Forgive me for keeping you in the dark this long; but I wanted to leave your minds free to concentrate on getting *Phoenix One* home safely. I never intended to use the figures you gave me."

"*Phoenix Two?* Hello, *Phoenix Two.* We're reading you; but don't understand. Did you say you didn't intend to burn at any time? What about the malfunction of your two engines?"

"There was none," said Fedya. "As I say, Mission Control, forgive me. If I had told you the truth to begin with, you would have wanted to argue with me. I did not want argument, particularly useless argument once my mind was made up."

"*Phoenix Two,* I don't understand—" Mission Control's voice suddenly broke off and changed to another voice familiar to Jen.

"*Phoenix Two,* this is Bill Ward. Fedya, what are you talking about? Have you been deliberately choosing to keep *Phoenix Two* as she is? Why, in God's name?"

"Leave him alone." It was Tad's voice suddenly, breaking in. "We started out to go to Mars, Bill. If one man wants to complete that mission, he's got a right to. Anyway, what're you going to do about it?"

"But . . ." began Bill; and stopped again.

"Please, Bill," said Fedya. "No arguments. We all know that the mission has to be completed, if there are to be more missions after this one. This spacecraft is a small capsule of all our efforts since time began; and someone has to see it

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safely to its destination. If it weren't me, it would have been one of the others—Dirk, Bern, Anoshi, Bap. One of us would have stayed with *Phoenix Two.*"

"Hey," said Tad, thickly, "don't forget me, you damned mutineer."

"I don't forget you, Tad," said Fedya. "But it had to be a well man. One who could stay alive until Mars is reached, and even after. Someone who could keep records and even maintain as many of the experiments as possible, so that the data will be there when the next ships come. I know . . . I know what I did in taking this away from you, Tad. But we agreed, all the rest of us agreed, that it had to be done."

"Sure," said Tad. "Sure. If I'd been in shape to think straight I'd have realized that earlier, myself."

He stopped talking. There was no sound.

"Fedya?" Tad said. "Fedya, you still reading me? . . . Fedya?"

"Phoenix Two, come in," said Bill Ward. *"Phoenix Two,* this is Mission Control. We do not read you. *Phoenix Two,* we've lost your transmission. Come in, *Phoenix Two. Phoenix Two,* come in . . ."

He continued talking. There was no answer.

Whoever had come into the observation room a little while ago, stepped forward. He was a stocky young man with blond hair and a slow Southern accent.

"Undersecretary of Science, Mr. Jen Wylie?" He was holding out a wallet, opened to show a card within bearing his photograph and several lines of information. "FBI, Mr. Wylie. You are under arrest, sir, on an open charge. Please come with me."

XVIII

"You'll find," said the U.S. marshal behind the desk at the St. Petersburg, Florida office, "everything that was in your pockets at the time you entered legal custody, is in this envelope. And if you'll just read and sign this last form . . ."

Jen, seated across from him, tore open the pink envelope and dumped change, watch, minicorder and cardcase onto the desk top. He scooped the items into the pocket of his new civilian clothes and took up the form.

"What's this?" he said.

"Just your statement that you have no immediate complaints about your treatment while under sentence. It's not a blanket release for the government, of course. You have up to six months to file charges against any officials or personnel whom you believe acted to you in an indecent, inhumane or illegal manner while you were under their authority."

"They were good enough," said Jen. He scrawled his signature.

"Very nice of you to say so, Mr. Wylie." The guard took it.

Jen grinned at him.

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"Got my 'Mr.' back, have I?" he asked. "Nine months of being called by your first name can get you out of the habit."

"Yes, sir," said the marshal. "I can believe it. I understand there's quite a movement on now for Retraining Centers personnel to be more formal and polite with federal custodees."

"Good," said Jen. "But prison's prison, no matter what you do about it." He opened the card case and saw it was empty. "My social security card?"

The marshal slid it across the desk to him. It was the same plastic card he had carried for years, but it was now a soft dove-gray in color, instead of its original white.

"Colored," said Jen, picking it up.

"Sorry, Mr. Wylie," said the marshal. "I understand there's a bill before the Congress to give you a complete pardon. But as long as your sentence was only commuted . . ."

"Don't let it worry you," said Jen. "As far as I'm concerned that gray is a battle award, for a wound taken honorably in the course of duty."

"Yes, sir," said the marshal.

"Tell me one thing, though," said Jen, as he got up and started to leave. "Do all departing Federal prisoners get the same polite treatment as this—or am I an exception?"

"All of them. Of course, Mr. Wylie," said the marshal. He stood up and offered his hand, across the desk.

Jen looked at it for a second.

"What the hell!" he said; and shook hands. "Good-bye."

"Good-bye, Mr. Wylie."

Jen turned and went out through the door into a busy, people-filled corridor. A glowing arrow pointed the way to his right. He followed it past the doors of more offices and out eventually into a parking lot, where a blue car was waiting for him. Standing beside the car was the tall, stooping figure of Sir Geoffrey, with Lin. Lin ran into Jen's arms.

"Where are we going?" asked Jen, when they were all back in the car once more; and Lin, at the wheel, had swung it out of the parking lot up onto the highway. They hummed northward.

"Back to Merritt Island," said Lin. "There's a small celebration there, planned to mark your getting out. No—" she added soothingly, as Jen stiffened, "nothing large. Just a couple of the 'nauts and Bill Ward, and some others. A couple of handfuls of people only."

"Good," said Jen, settling back. "Nine months quiets you down a bit. I don't think I could take brass bands right away. Anyway, the big thing isn't me. It's Fedya riding *Phoenix Two,* alive, all the way to Mars, the way he has; and the fact that what he's done, and Tad's

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death, and all the rest, did more for the future of people in space than anything."

"Get the papers, did you?" said Sir Geoffrey from the back seat.

"Oh, yes," said Jen. "Not at first—but the last three months I've been able to follow it all. Radio signals from Fedya's body sensors that could tell us he was still alive and active; the popular reaction all over the world; the blame for the mission's trouble getting pinned where it belonged, on politics as usual—"

He swiveled his car seat about to look at Sir Geoffrey, who was occupying the back couch of the vehicle, knees in the air.

"No offense in your case."

"Why not?" said Sir Geoffrey, cheerfully. "It was a good system. Politics as usual helped build the Earth. I was all for it, once. Not ashamed of the fact. But outside the Earth, evidently it's a clog, not a benefit. Right. Scrap it then. I have, and not ashamed of that, either."

"Geoff," said Lin, "was our strong right arm in getting your sentence commuted this early, Jen. He was the man who knew just what strings to pull and what buttons to push, and when."

"That so?" said Jen, staring at Sir Geoffrey. "What did the British government think of that sort of activity on your part?"

"Oh Lord," said Sir Geoffrey, "I'm retired. I quit right after that press conference of yours. Don't know why I didn't do it years ago. I can drink all I want now, whenever I want. Odd thing, I used to fear I'd end up one of these boozy old men that everybody slides away from at parties. But not at all. After a bit I just get sleepy and doze off. Don't even snore, they tell me."

He looked at Jen triumphantly.

"What do you think of that?"

"Amazing."

"Ah, well," said Sir Geoffrey, "only a natural talent, I suppose. But then, I've never been what you might call the average, ordinary sort of man."

"The celebration at Merritt Island's for Fedya, too," said Lin. Jen swiveled his chair back to face her. She sat in profile, her hands on the curving bar that rimmed the upper part of the half-wheel. Beyond her profile, the high acoustical wall guarding the concrete highway was momentarily a blur of black color, warning of a housing area behind it, where quiet was required.

"They're not putting me in the same bag with Fedya!" said Jen.

"No, no. Not really," said Lin. "It's just the two occasions come at the same time. You're free, and Fedya reached Mars ten days ago. If he's following the schedule they calculate for him, he's due to land on the surface, today."

"All that distance . . ." said Jen, half to himself, his eyes unfocusing

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on the concrete wall's blackness, like the darkness of airless space between the starpoints, spanning from the highway on Earth to the crater-dust of the Martian soil. "All that distance . . ."

In his spacesuit, Fedya moved slowly but continuously. He had redoubled his exercising the past three months. He had even set up in the wardroom on B Deck the "squirrel cage," as the emergency centrifuge wheel was called; and spent two of his daily waking hours under its simulation of gravity. But the slowly debilitating effects of no-gravity had continued to weaken him.

But in the total absence of gravity, patience and a minimal amount of strength could accomplish a great deal. For seven months now, Fedya had done all he was capable of doing in the way of maintaining the original work and records schedule of the mission. His records, his log, were complete and up to date. Now, it was time to do something for himself.

With *Phoenix Two* now in orbit about Mars, he had worked the Mars Excursion Module out of its storage compartment in the airless forward section of *Phoenix Two;* and readied it for a landing on the alien world below. Now, he entered it; and a few touches on the position thrusters separated it from its mother craft.

The on-board computer of *Phoenix Two* had given him the figures he needed. He retrofired the MEM's descent stage rocket motor for the descent; and fell toward the surface. As they came close, the protective shroud and a portion of the heat shield was jettisoned—the latter an automatic action to allow use of the ascent stage of the MEM as an abort vehicle, unnecessary here since Fedya did not intend to return to *Phoenix Two.*

Close to the Mars surface now, it seemed to swell away on all sides below him like the cratered surface of some larger moon—Fedya used the descent stage motor again, for braking. His descent slowed, slowed, until he was finally hovering, just above the surface. Then he went down.

The jar of landing was small. Fedya sat where he was at the controls, wrapped in silence. The weariness that dragged him down into apathy, urged him to stay where he was, comfortably seated, waiting for the final slowdown of his body into death that was not far off, now. But he had not come all this way to be found still encased in a vehicle, some yards above the Martian soil.

With great effort, he put himself into motion. It was an even slower business here, where he had the gravity of Mars to make his work heavy; but he struggled, and rested, and struggled again.

Eventually, he was out of the MEM, and down its metal ladder

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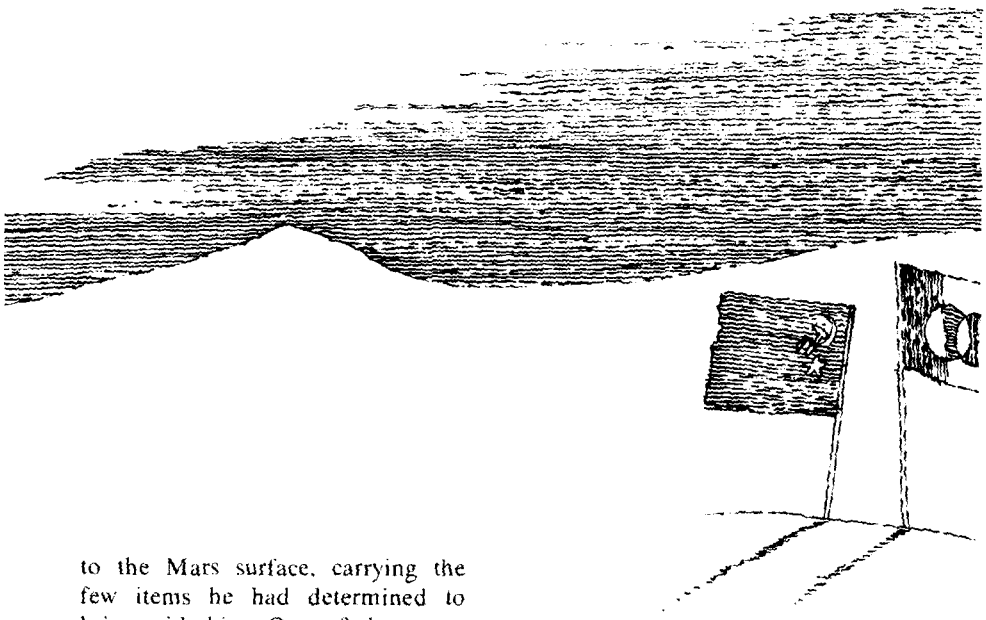

to the Mars surface, carrying the few items he had determined to bring with him. One of these was the United Nations Flag, which he set up on the rubbled ground, together with smaller flags of the six national areas who had combined in the Mars mission. With the colors of the artificially stiffened flags standing out in the light of the distance-shrunken sun, he turned to put up the locator beacon that would be activated by those who came after him, searching for the spot where he had landed, within the area where he had written in the log he would set down.

These two items out of the way, he was free. He began at last to assemble the framework he had designed and built aboard the *Phoenix Two* during the last two months. When it was done, it showed itself as a sort of standing support—half chair, half crutches. He had positioned it facing the sun; and when he backed into it, and relaxed, it held him facing the light.

He hung in his support. It was not uncomfortable, in Mars light gravity; and now that he gave way, at last, he could feel that the end, for him, was very close. He sighed a little with satisfaction.

The mission had reached Mars. Man had reached Mars. Here he was, and here he would be when those who would come after arrived to find him. They would find

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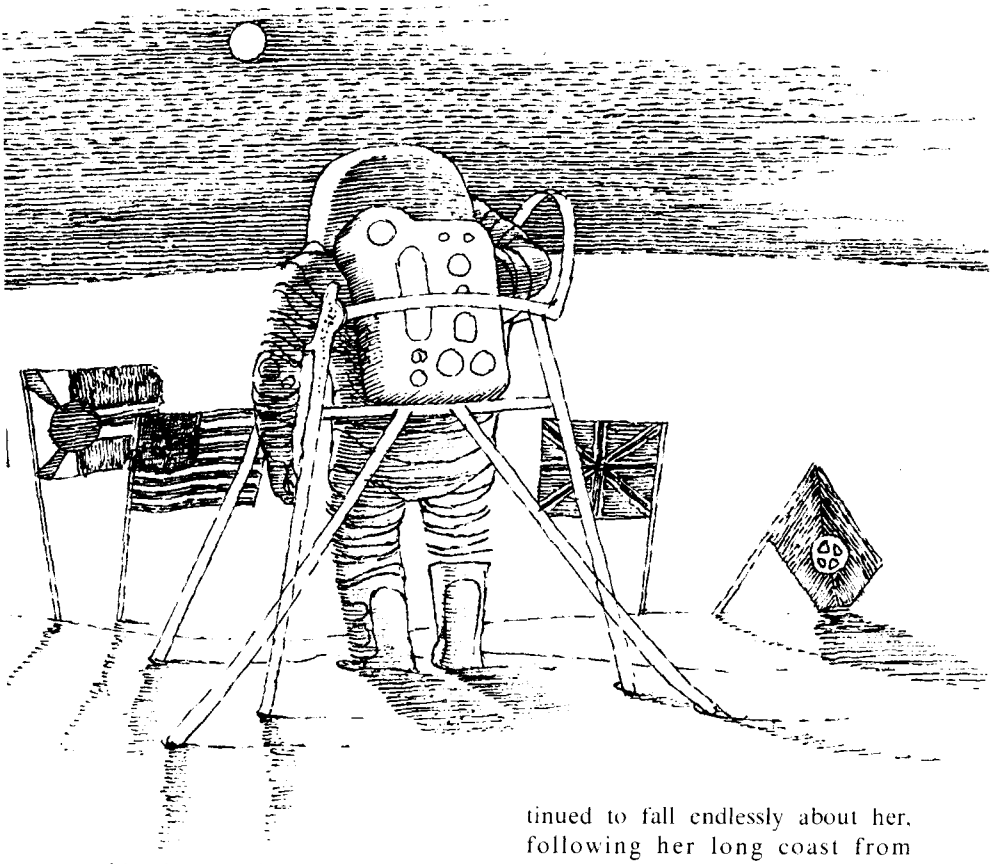

him here as he was now—waiting, upon his feet.

I am the first Martian, he thought, with slow whimsicality.

Far above him, in orbit, *Phoenix Two* faithfully continued to rebroadcast to Earth the radio signal relayed to it from the MEM and to the MEM from the sensors in Fedya's underclothing beneath the spacesuit. The body signals were growing weaker. Very soon, they would stop entirely.

Meanwhile, *Phoenix Two* continued to fall endlessly about her, following her long coast from Earth. Even after the signals from the ground had long ceased she would continue to orbit, rushing through space above the red planet, glinting in the light from the far-off sun, and waiting.

Waiting for the other men and women who would come before too long now. Who must come, since there was now no other choice. Because for human beings it had always been that way. The road led always forward; and there was no turning back. ■

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the reference library

P. Schuyler Miller

PART-TIME SCHOLARS

Some years ago Dr. William Fenton, then Director of the New York State Museum and now Professor of Anthropology at the State University of New York at Albany, coined a name for a group of non-professionals who, in his opinion, were making a real contribution to American archeology. He called them "part-time scholars."

Part-time scholars, who spend their own money and their own time to do what the professionals are paid to do, have an honored place in many sciences. They were recognized early in such poorly paid fields as astronomy and biology, where they are still finding new plants, new insects, and new data on known species. Until recently, they have also provided the bulk of the bibliographical and critical contributions to the study of science fiction. If you sift them out of the vast hordes of "fans," they still outnumber the professionals and know a good deal more about SF. Moreover, instead of waiting for space in an Establishment journal, they like as not publish their findings and opinions themselves.

The dividing line between the pro and the semi-pro is weak and wavery. At the moment, I have on my desk three cases in point:

A study of H. G. Wells, drafted as a doctoral dissertation by a veteran science-fiction writer turned college English teacher—Jack Williamson's "H. G. Wells: Critic of Progress," published by Mirage Press for $5.95. (Some of you have had trouble finding Mirage. Its address is 5111 Liberty Heights, Baltimore, Maryland 21207.)

A collection of editorials on past and present science fiction, by the editor of a now defunct series of reprint magazines—Robert A. W. Lowndes' "Three Faces of Science Fiction," $5.95 from the NESFA Press, Box G, MIT Branch Station, Cambridge, Massachusetts 02139. (This little 96-page book was published by the New England Science Fiction Association in a limited edition for the 1973 "Boskone" SF convention in Boston, at which "Doc" Lowndes was guest of honor.)

Bits and scraps of commentary, letters, and notations by an old-time poet and fantasy writer, not very well known to present readers, who had strong ideas about the relationship of science fiction and fantasy—"Planets and Dimensions" by Clark Ashton Smith. (Another labor of scholarly love from Mirage

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Press, $5.25 hardbound, $3.50 in paper. It is even smaller than the Lowndes book.)

Any of these three books could be, and perhaps should be, analyzed at length here. It would take all our space, and I am probably not qualified to do it anyway. My part-time scholarship is by no means as profound or varied as the authors', and to summarize their opinions and arguments would amount to trying to abstract their books. I will settle for trying to give you an idea of what the books are like, so you can decide whether to talk your friendly public or college librarian into buying them, or whether you prefer them to a night on the town, alone.

Jack Williamson is Professor of English at Eastern New Mexico University. The first version of "H. G. Wells: Critic of Progress" was written ten years ago; it earned him his Ph.D. at the University of Colorado. A condensation ran in *Riverside Quarterly,* the excellent magazine published by Leland Sapiro from the University of Saskatchewan. Science fiction hadn't become an "in" thing in the universities—at least, the university presses didn't know it had—so one after another they found it unsuitable. Now a part-time professional has published it.

This is a commentary on Wells' early and best science fiction, written by a man who was weaned on it in the early days of *Amazing Stories,* and who undoubtedly used it as a guide when he began to write SF himself. After all, who didn't in those days? He shows us how Wells, tormented by his own childhood on the fringes of a London slum and inspired by the ideas thrown at him by the great T. H. Huxley and others, reworked them into the vivid but pessimistic short stories and novels of his early writing years. First, Williamson says, he showed mankind at the mercy of the universe and other beings in it. Then, in the later books, he presented human society as an even greater and more capricious and captious enemy of the individual. These are two of the most basic themes of SF, good and bad.

Later, as Wells became successful and was accepted as a prominent thinker, Williamson feels that he decided that human intelligence—his intelligence—could prevail over both implacable Nature and irrational Society. He became a utopian and a preacher, and his novels became unreadable. The study doesn't carry him into those years, except briefly.

This isn't a definitive biography of Wells. It isn't even the most scholarly analysis of his science fiction. There are other books—the best never published in the United States—that preempted that place. It is, however, something unique—a thoughtful look at why Wells wrote the kind of science fiction he did, and why his books opened the way and set the pace for three generations of science-fiction writers.

"Doc" Lowndes' essays were the outstanding feature of the fanzines that he published for many years, and his editorials in *Famous Science Fiction* and its companion magazines were often the best rea-

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son for buying the magazines, if you could find them. He had excellent taste in stories, he knew why he liked them, and he told his readers. The MIT group collected five of his essays on science fiction and Lowndes revised them and supplemented them for this 500-copy Boskone memento.

He discusses three major reasons why some people write science fiction, why others publish it, and why still others read it. There are those who, like Hugo Gernsback, feel it should teach science painlessly but graphically. This was Jules Verne's approach. There are others who want to use it as propaganda, to present a point of view and persuade readers of its validity and importance. This, as Jack Williamson points out, was Wells' way and it is certainly prevalent now.

The third purpose of science fiction is to delight its readers. Lowndes gives half the book to this subject, and compares the success of three old-time writers—Verne, Wells, and Edgar Rice Burroughs—and three of the not really modern school—Robert A. Heinlein, James Blish, and Dr. E. E. Smith. He shows how they use invention, suspense, characterization, surprise, and creative richness, and what demands they make on their readers. (The books you remember are the ones that do demand a contribution from you, aren't they?) Incidentally, he considers Heinlein's "I Will Fear No Evil," which I didn't like at all, an excellent book. Heinlein, he says, is "a man of conviction . . . whose convictions have not ossified, as Wells' did."

The price is high for a very small book, but you'll enjoy it.

I am including "Planets and Dimensions" here mainly because it *is* here, as part of Mirage Press' contribution to books about science fiction and fantasy, and partly, I suppose, because two of the best items are excerpts from a "debate" Clark Ashton Smith, an established poet and author, carried on in the letter columns of *Wonder Stories* with a twenty-year-old—me. At twenty I was valiantly espousing an overdue "new wave" that would bring the values of mainstream writing (Victorian mainstream writing, I guess) to fantasy and science fiction. Smith defended the old values, as I do now. He felt fantasy gave a writer more elbow-room (a term he would never have used, but I can't find the one he did use) than stories tied to the known and limited.

Clark Ashton Smith was, after all, a poet and fantasist, and most of these fragments deal with those aspects of his life, work and interests. If they don't interest you, so be it. (The jacket, incidentally, has an excellent portrait sketch by an artist whose name I can't read or find in the credits. The book was edited by Professor Charles H. Wolfe of Middle Tennessee State University, with help from a number of Smith's friends and contemporaries.)

BEST SF: 1972

edited by Harry Harrison and Brian W. Aldiss • G. P. Putnam's Sons, New York • 1973 • 254 pp. • $5.95

This is the second of the five or

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six "best" anthologies to appear, and the first hardback. It has the added virtue that three of the twelve stories originated here in Analog. (There are also five poems and a collection of cartoons.) The Analog stories are Joe Haldeman's long and controversial novelette on the "war is hell" theme, "Hero"; Ken W. Purdy's satiric picture of future "justice," "In the Matter of the Assassin Merefirs"; and Howard L. Myers' even deeper-probing picture of *lèse-majesté* among the Scientific Establishment, "Out, Wit!"

I read these three first and was trying to decide whether "Hero" or "Out, Wit!" was the best in the book, when I started Keith Roberts' "Weinachtabend" from *New Worlds 4.* This is a gently terrible evocation of what might happen in an alternate present in which Hitler conquered England. The narrator is one of the collaborating bureaucracy, sent by an underground to kill his boss during a pagan Christmas Eve festival in the tradition Hitler hoped to reestablish. The quiet subtlety with which the story is told and your slow understanding of what has happened make it unforgettable.

I'm sure you read "Hero" here, and have followed the screams of the populace. It is rather in the mood and manner of Robert Heinlein's "Starship Trooper," but written by a Vietnam veteran who has not quite Heinlein's faith in the military solution. That the gooks "our guys and girls" are fighting are extraterrestrials, and hence natural laser fodder in the tradition of space opera for half a century and more, does nothing to weaken Haldeman's point: hot or cold, war is designed to be hell.

Peace, in its way, is hell in "Out, Wit!" This is the story of a young scientist who lacks the status to be facetious. His college-level humor destroys him and buries a discovery that the rest of the world is smart enough to appreciate. They're quite willing to take advantage of it, too, since he hadn't ridiculed them. But American Science Wins Through in a way only a scientist—perhaps only a young scientist—can fully appreciate.

In "The Matter of the Assassin Merefirs," of course, the law has become hell. Certain tendencies that are alleged to be present and flourishing in present-day courts have flowered and fruited in a trial story that Swift would have liked.

Now for the other outsiders. As usual, Messrs. Harrison and Aldiss have gathered them in from a strange variety of places, including *New Statesman* and the *Sierra Club Bulletin*. The five poems, of which I refuse to say anything, are mainly from a magazine called *Cornudo* and the cartoons are from here and there. James Gunn's "The Old Folks" and the fable by the Brazilian writer, Andre Carniero, "Darkness," are from "Nova 2"; I reported on them there. There is also a little story from a school paper in Ghana, "An Imaginary Journey to the Moon" by Victor Sabah, which is an extraordinary combination of ideas that would have been current when Cyrano de Bergerac made his Moon voyage in the Seventeenth

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Century, and the politics of modern Africa.

The *Sierra Club* item, "From Sea to Shining Sea" by Jonathan Ela, is a poker-faced account of the canal which the Corps of Engineers proposed to dig from Boston to San Diego and/or Seattle. (I believe they really have proposed such a transcontinental seaway—or maybe that was a hoax, too.) Robert F. Young's "The Years" is a little time-travel bit about the old man who goes back to see his wife as a young girl. Alex Hamilton's "Words of Warning" is pure fantasy: words stage a revolt against the people who have used them so poorly and cruelly. And English writer Christopher Priest's "The Head and the Hand" is a grotesque, a piece of *Grand Guignol* that reflects a sick society.

Aldiss, as usual, sums up the state of the art; he has hope for it. Harrison has a brief introduction. On the whole, it is one of their poorer assemblages—which may be precisely what they wanted to show about the SF of 1972.

THE 1973 ANNUAL WORLD'S BEST SF

edited by Donald A. Wollheim • DAW Books, New York • No. 53 • 253 pp. • 95¢

There were five anthologies of "best" SF last year, which I was fool enough to try to cram into one column. There may be at least six this year—veteran fan Forrest J. Ackerman is editing one—of which this is the first, and to date (June) the best. This year I'll take 'em as they come. By the time you read this, incidentally, there should also be a hardbound Science Fiction Book Club edition priced at $1.98.

Analog had two of the ten stories in Donald Wollheim's collection: Frederik Pohl's "The Gold at the Starbow's End," which most people seem to like better than I do, and Vernor Vinge's "Long Shot." This is the kind of story that Murray Leinster did better a long time ago—the story of a personified machine, a starship which is designed to carry mankind to the stars in the only way it may ever be done. (Oddly enough, Pohl's story is a switch on another solution, the generation ship.)

Best of the lot, though, is Poul Anderson's "Goat Song," which won him a Nebula award from the Science Fiction Writers of America. This is the Orpheus legend, transplanted into a future when a computer has made herself the Earth Mother of a dwindled society, and a harper finds a way to have his dead wife recreated. Obvious? Corn? You should know better.

What must be the strangest form of time travel ever imagined is the theme of James Tiptree, Jr.'s "The Man Who Walked Home." He did indeed—from the distant future—on his own two feet, becoming a legend as he went. Happily, Tiptree is unpredictable.

Michael G. Coney is an English writer whose previous work I have overlooked. Before his death, "Ted" Carnell found "Oh, Valinda!" for his *New Writings in SF* series. On a distant planet a pair of Earthmen and their native guide try to navigate an iceberg through

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stormy seas, propelled by a monster worm. Science fiction used to be like this sometimes.

"To Walk a City's Street" is as unusual a little story as you've ever seen from Clifford D. Simak. Perhaps they have such people in his native Minnesota. Perhaps the Indians had them, or the first Norse settlers. But Ernie is a moron who has only to walk through a city's streets, and the people he passes are made well. But . . .

In a way, T. J. Bass' "Rorqual Maru" is a companion piece to Vernor Vinge's story, for its computer-operated sea-harvester has a personality of its own. This happens in a bland, hungry future when even the sea has ceased to feed the land hordes, and the giant trawlers have been abandoned. But there are other, adapted humans at the bottom of the sea, and in time land and sea hosts discover each other, and the *Rorqual Maru*.

Nowadays "SF" contains its percentage of out-and-out fantasy, and W. Macfarlane's "Changing Woman" is our example here—sympathetic magic mechanized and used to control earthquakes and other catastrophes. Still, if such things be, they must have a science.

Robert J. Tilley makes unusual use of time travel in "Willie's Blues." A collector of jazz goes back to 1936 to steer a black musician out of a dead end into the place he deserves. But he has had to use an anachronism that undoes what he intended.

Finally, Phyllis MacLennon's "Thus Love Betrays Us" is the story of a man marooned on another world, supposedly uninhabited, and of his strange relationship with the beings he does find living there in the fog and dark.

They're all good stories. Wollheim's choice needs no defending.

ORBIT 12

edited by Damon Knight • G. P. Putnam's Sons, New York • 1973 • 254 pp. • $5.95

Damon Knight's series of hardback anthologies of original SF continue to take a lot of awards, but their editor takes a very liberal view of what "SF" covers. Apparently any story—even if it isn't a story—that has sent and does send him and the author into orbit, even temporarily, is acceptable.

There are fourteen stories in the new volume, counting four connected vignettes by Brian Aldiss as separate stories. Three of the fourteen are out-and-out fantasy. Ursula Le Guin has a nice little tale, "Direction of the Road," told by an oak tree. Steve Chapman's "Burger Creature" is just that—a humanoid which constitutes itself from the unswept sweepings of a burger joint, or from the dribblings from its garbage. Doris Pischeria's "Half the Kingdom" is a fairy tale for moderns.

Aldiss' "Four Stories" are among the best in the book, and I'll take them back from the fantasy pigeonhole and assume that they are set on an alternate "Earth," one with winged people, wandering dinosaurs, surviving Neanderthalers, lute-playing Mousterians, and similar oddities. What Brian Aldiss has done is set a series of Eighteenth

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Century style Italian *contes* about a roving actor and his circle of friends in this very familiar, very bizarre society and environment.

"Continuing Westward" by Gene Wolfe is about English airmen, probably of World War Two vintage, taxiing a crashed biplane across the arid plains of eastern Turkey. Edward Bryant's "Pinup" is about a kook (female, of course) who makes plaster casts of peckers. Science fiction? On the other hand, Bryant has a good story, "Shark," about a woman who has had her brain transplanted into the body of a man-eating white shark as part of a Navy research project.

The two best science-fiction stories in the book are Michael Bishop's "The Windows in Dante's Hell" and Vonda N. McIntyre's "The Genius Freaks." I'd rate the Aldiss stories next, followed by "Shark." Bishop shows us a future Atlanta as a crowded, corrupted, nightmarish dome city in a forsaken countryside. Apparently the population has crawled together like a slime mold, in a few centers, and individuals and society have gone freakish with inbreeding. It's terrifyingly believable. The McIntyre story is told by Lais, the test-tube-born genius who finds her world horrible.

Kate Wilhelm never writes a bad story, but her "The Red Canary" suffers by comparison with the others. It makes the hopelessness of today's ghetto life, trapped by bureaucracy as much as by poverty, perpetual and universal. Mel Gilden, last of the lot, has an extraterrestrial problem story in "What's the Matter with Herbie?" Its narrator, Nert, is the kind of space-rover who relishes a home-style meal of frigul with grummice and proshmingles and does not care for boiled greeb. His buddy Herbie has a health problem, and Nert has to employ some plain and fancy blackmail to get him out. It's the old sailors-in-a-foreign-port yarn switched, but it's fun. Maybe I should have rated it higher.

NIGHT OF DELUSIONS

by Keith Laumer • G. P. Putnam's Sons, New York • 1973 • 190 pp. • $5.95

This is the kind of book you simply have to ride with. If you fight its outrageous tumble of incident, or try to work out what is really happening to seeming detective Lance Bardell, it may drive you up the wall.

Bardell is hired as bodyguard for a senator who is plagued by delusions of cosmic persecution. This being an SF action yarn, you know at once that he is being hounded by extraterrestrial baddies (and a few of the home-grown variety, too). Question is, by whom and for why? That is, that's one question. In no time at all, others start popping out of the wainscoting. There are universes as interlocked as an Escher drawing. There is a girl who keeps turning up on Square One in different costumes. There is the senator—who sometimes isn't the senator (and for that matter, Bardell who sometimes isn't Bardell).

As they used to say in burlesque (and probably still say in nightclubs), just lie back and enjoy it.

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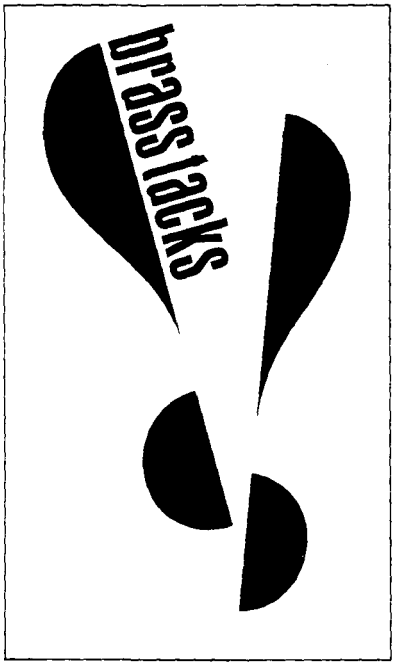

Dear Ben:

Analog is the most appropriate place in which to enter a public protest against the John W. Campbell Memorial Award for best science-fiction novel of the year, first bestowed on April 6, 1973 at Illinois Institute of Technology.

Needless to say, I act strictly as an individual. By the time this can see print, my term of office in Science Fiction Writers of America will have expired. If anyone wants to suppose that what follows represents a spirit of sour grapes, he can go to hell. I write very reluctantly, as a painful duty. Everyone concerned is a friend of mine. I have eaten the salt of several, and can only hope they won't feel personally aggrieved by my dissent.

Nevertheless—the moment I saw announced who the judges would be, I said, "Oh, Lord, they will without fail pick things John Campbell would instantly have rejected." The prediction has now been verified.

Mind you, the winners are not bad books. They are excellent books, well deserving of recognition. Indeed, the second-place honoree, "The Listeners" by James E. Gunn, is in my opinion one of the best SF novels ever written. Witness the fact that, when editing the fourth volume of Nebula Award stories, I chose from among runners-up the original novelette from which it grew.

However, John remarked to me when he saw that anthology that there was not a single piece in it which he would have bought. And this is what my protest is about: not the new award itself, nor the choices made, but the misuse of John's name.

Consider. First place went to "Beyond Apollo" by Barry Malzberg, undeniably well-written but gloomy, involuted, and technophobic, perhaps the three qualities which John most strongly opposed. Among reasons given was its "realistic recognition of man's fallen state, a requirement of good literature."

That this is a requirement would be news to the authors of the *Iliad,*

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the *Odyssey*, the *Aeneid*, *Beowulf*, the *Elder Edda*, the *Shah Namah*, the *Tale of Genji*, the *Dream of the Red Chamber*, *Shakuntala*, or any others outside the Judeo-Christian tradition—and many inside it, including most especially John Campbell.

The judges may claim that they don't mean the Biblical Fall. Then what do they mean? Man's imperfection, perhaps man's imperfectibility? In that case, why didn't they say so? Probably because it's too commonplace and commonsensical. After all, it is impossible to write either well or badly about man as he is without noting some imperfections.

I am forced to conclude that "man's fallen state" is another of those semantically empty academic chant-phrases, like "the human condition," the sort of thing which caused John, and me for that matter, to stop long ago taking academe seriously.

It is unnecessary to discuss the rest of the list, except to repeat that they are all good books and all antithetical to everything John stood for.

The judges may argue that John stood for progress, and it would be a disservice to his memory to embalm SF as of the moment of his death. True. But John never urged *this* kind of progress. He resisted it right down the line. He considered it retrogression. What he wanted was always new ideas, new insights, orientation outward rather than inward.

Naturally, this is not the whole of SF, nor should it be. Works like these winners are a vital part of our field. They just aren't John's part of it.

One can readily understand that the judges, dissatisfied with the Hugo and Nebula procedures, felt something else was needed, and established it. That's fine per se. What is not fine is their misappropriation of a great man's name. I suspect that most SF readers will agree with me, and that the result will be the discrediting of the whole enterprise.

Gentlemen, it's not too late to correct your mistake. You need only change the title. How about, say, the H. G. Wells Memorial Award? Nobody would object to that, and you would serve your purpose of encouraging the kind of SF which meets with your approval.

Meanwhile, though, I suggest that until such change has been made, writers who feel as I do join me in withholding their works from consideration for this prize.

POUL ANDERSON

The judges of the John W. Campbell Memorial Award had to face a basic problem: Would they give the award only to books that promulgate John Campbell's view of science fiction, or would they consider any type or style of SF novel? Obviously, they chose the latter course, as Harry Harrison explains in the letter which follows.

Dear Ben:

I am most distressed to see Poul Anderson making a personal issue about the John W. Campbell Memorial Award. This award is in-

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tended to honor the memory of a great man, as well as to be an attempt to establish a quality award in the science-fiction field that will rank with the other major literary awards.

The judges are all men of knowledge and experience in the science-fiction field. Dr. Stover, Dr. Clareson and Dr. McNelly all teach science-fiction courses at the university level. They are all also critics and experienced anthologists of SF. Brian Aldiss, in addition to being an SF author, is a critic of note who has just published "The Billion Year Spree" (Doubleday), the first critical history of science fiction. Brian joins me in editing the annual "Best SF" series as well as co-editing the anthology "The Astounding-Analog Reader," which is a tribute to the editing of John W. Campbell. I also edited "The Collected Editorials of John W. Campbell." The award was financed in part by money I received for editing an anthology of original stories titled "The John W. Campbell Memorial Anthology." The award has the knowledge and approval of Mrs. John W. Campbell, and one of the awards was presented by his daughter. All of us are sincere in our belief that John Campbell was the authority behind the growth of modern science fiction and wish to honor his name with this award. We have the complete cooperation of all the publishers of science-fiction books who recognize the value of this type of award. We are attempting to advance the quality and standards in the field of literary endeavor to which John Campbell devoted his life. It is irrelevant to attempt to guess whether he would have published the winning books or not.

I am very disturbed that Poul Anderson seeks to denigrate our work. Our aim is to honor the best books in the entire field, not only the certain types of books that he feels are the only important ones.

To make this an award given without prejudice or favor, on quality alone, we must consider every novel published during the calendar year. It has been agreed that a judge with a published novel that year must have a replacement on the awards committee for that year. Therefore, I hope that Poul Anderson will reconsider his untimely suggestion that his works be withheld from consideration. And I am sure he will withdraw his request that other writers withhold their books. We are attempting to bring unity to science fiction and can only decry any attempt to use this award to sow disunity and discord.

HARRY HARRISON
Executive Secretary,
The John W. Campbell
Memorial Award

Dear Ben:

The mail in response to my article, "Magic: Science of the Future?" (December 1972 issue), contains recurrent questions about various psionic devices which can probably best be answered by patent specifications other than that of the Hieronymus machine.

There are several other detailed patent specifications on these de-

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vices available from the British Patent Office:

Hieronymus' newest, published on January 2, 1952—Number 663,978, titled "Detection of Emanations from Materials and Measurement of the Quantities of Said Materials."

Ruth Drown's apparatus for obtaining X-ray-like photographs of the human body from blood samples, titled "Method of and Means for Obtaining Photographic Images of Living and Other Objects"—British Patent Number 515,866.

The De La Warr Camera, titled "Therapeutic Apparatus"—British Patent Number 761,976.

And finally, William Ernest Boyd's "Instrument for Detecting and Investigating Emanations Proceeding from Substances"—British Patent Number 198,018.

It has taken me a couple of years to trace these patent specifications, but they all throw new light on the U.S. patent for the Hieronymus device, and should be extremely helpful to anyone interested in experimenting with this new kind of energy.

Analog readers can obtain these copies by writing directly to: The British Patent Office, Sale Branch, St. Mary Cray, Orpington, Kent BR5 3RD, England.

JOSEPH F. GOODAVAGE

Dear Mr. Bova:

The reader of Stephen A. Kallis' excellent piece ("Minicomputers," May 1973) will labor under a semantic difficulty, through no fault of Mr. Kallis.

A "computer" is actually a data processing machine. It should be clear that no arithmetic machine, however rapid its operation or however capacious its memory, could possibly undertake such a diversity of chores as noted in Mr. Kallis' account of the mini. Mere capability with arithmetic is insufficient. In actuality, the computer transcends computation.

But all is well that ends well, and if one goes back to origins it becomes clear that "computer" is a machine with which to think: from the Latin *putare,* "to think."

ALEXANDER DONIPHAN WALLACE
Department of Mathematics
University of Florida
205 Walker Hall
Gainesville, Florida 32601

And a rose, by any other name . . .

Dear Ben:

One small correction to Stephen A. Kallis' article, "Minicomputers," in the May 1973 issue: a science-fiction writer *did* predict that television would accompany the first men to land on the Moon. The writer was Bill Finger and the story, "The Last Television Broadcast on Earth!" which first appeared in the October/November 1955 issue of *Mystery in Space,* and was reprinted in the January/February 1971 issue of *Strange Adventures.* In time-honored tradition, Finger predicted the first Moon landing would occur in 1983, and the first Mars landing by men in 2001. The Moon rocket was the typical streamlined phallic symbol and the five men to land on the Moon plant a United Nations flag.

Never mind that "The Last Tele-

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vision Broadcast on Earth!" was a comic-book story—let's give credit where it is due.

BRUCE ROBBINS
P.O. Box 396
Station B
Montreal 110, PQ, Canada
Thanks for the information.

Dear Mr. Bova:

I can't let your May editorial "Who's in Charge Here?" out of my mind without at least a brief comment. I'm a progressive conservative opposed to over-centralization of power in any form; I also voted for Nixon and don't regret it or feel betrayed, not over Vietnam or even Watergate, at their worst.

Our country doesn't know "who's in charge" for several reasons. On the governmental level neither the Congress nor the courts are providing a national direction or purpose, nor do they accept a role of responsibility for all national interests. The Presidency is assuming the role of a God-Kingship, if in fact it is, through default more than by Presidential design. We have been fortunate that the last three Presidents have accepted the responsibilities and exercised the powers when no other agency would or could. I'd rather have effective, nondemocratic leadership during these hard times than have ineffective, confused leadership which is all our Congress has provided.

I would prefer a strong, effective Congress riding herd on a strong, effective President with a courageous, enlightened court as moderator. Since I can't have that at present I'll take what we've got, be glad of the two-term limit, and give support to effective Presidential leadership. Who knows, Nixon's productive use of power to gain policy initiative may prod some Congressmen into a productive response. Meanwhile Nixon is playing wisely by holding his cards close. If no one has the intelligence, courage, and ability to gain enough popular support to force a show of hands and a new open deal, then they shouldn't expect to sit in on the game only because they believe themselves to be morally justified.

HOWARD THOMPSON
5817 Coventry Lane
Austin, Texas 78723
Effective government depends mostly on effective citizens. The failure of American politics is that the "best" of our citizens have refused to get involved in politics, for the most part. The result: "politicians!"

Dear Mr. Bova:

We science-fiction readers like technical accuracy in both our stories and editorials. In your editorial, "Who's in Charge Here?" in the May 1973 issue of Analog, you refer to North Vietnam's antiaircraft defenses as "third-rate" and our B-52 bomber losses as "unacceptable."

It is suggested that some research may be in order. The January 1st, 19th, and February 12th issues of *Aviation Week and Space Technology* report facts and figures which reveal quite a different story.

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The fact is that the North Vietnamese air defenses are hardly third-rate. They have search and fire-control radar systems. They have radar-controlled antiaircraft guns for low-altitude coverage, MIG-21 jet fighter aircraft armed with air-to-air guided missiles, and surface-to-air (SAM) guided missiles for high-altitude use (such as the B-52 attacks).

I do not know of any city in the U.S.A. or the Free World that has defenses which begin to compare, do you? Now please don't rebut on the basis of their need for air defense, that is understood; the point is that they just may have the best air defense of any city on Earth, at this time.

When the two-hundred-airplane B-52 "iron bomb" fleet was sent against North Vietnam in December of 1972, they flew into a rebuilt and replenished defense system which was primed, ready, and waiting. The battle which followed was the first ever which could be considered a full-scale electronics countermeasures battle (third-rate?). Salvos of as many as one hundred SAM's were fired blindly at the B-52 formations when ECM jammed the missile fire-control radar systems.

The B-52 losses reached a peak on the third and fourth days of the attack, when six were lost. The North Vietnamese defense was rapidly weakened by the heavy pinpoint bombing which concentrated on the defense installations in the early phases of the attack. The bomber tactics were modified to counterdefensive measures, and as a result, on the fifth and sixth days no B-52's were lost and the loss rate in following days was low. A total of fifteen B-52's were downed over North Vietnam during these attacks; the loss rate was between two and three percent, based on sortie rate and number of aircraft. Remember, these aircraft kept returning, mission after mission. Now, Mr. Bova, what would you have considered an acceptable loss rate?

It has been reliably reported that these attacks literally destroyed North Vietnamese ability to continue the war (at that time), and led directly to the cease-fire agreements at Paris.

It is probably true that most Americans prefer not to think about the specifics of military science and technology. However, we live in a technological world (in peace and war) and it behooves us to properly understand the scope of our technological involvement. Now, what I ask is this: please don't accept and repeat any more typical TV news pap, such as "third-rate" air defense or "unacceptable" losses, in your fine publication.

THOMAS L. POPPELBAUM
2636 Edgewood Road
Utica, New York 13501

For more than fifteen years, I have been closely associated with the aerospace industry and the Department of Defense. Hanoi is a well-defended city, but it is third-rate compared to Moscow and other U.S.S.R. targets. The events of December 1972 led me—and others—to seriously doubt that our B-52's could

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penetrate Russian defenses adequately. Which debases their value as a deterrent force.

Dear Mr. Bova:

I think you exaggerate somewhat in stating that the American armed services were destroyed as a credible deterrent to aggression by the Vietnam War—especially in classifying our B-52 losses over North Vietnam as "very heavy" and "unacceptable." If you are thinking of the psychological effect on the American public, you may be right—about the people in your part of the country. In the sense of military losses, however, one can hardly classify an overall loss rate of about two percent as either very heavy or unacceptable. Compare, if you will, the statistics of World War Two against heavily defended targets such as Berlin, Schweinfurt, and Ploesti where losses ranged from ten percent to thirty percent on a single mission.

Note also that the B-52 was being used over a mission profile it was not designed for. As a nuclear deterrent against Soviet targets the B-52 would have obliterated its target area from a hundred miles out with one of its twenty SRAM nuclear missiles. There would be no need to expose the airplane to the dense concentration of SAM sites which took the toll.

It is also exaggeration (of another sort) to classify the defense system of North Vietnam as "third-rate." The SA-2 missile is the best in the Soviet inventory for its specific target—high-altitude aircraft. The late-model SA-3, which you may have been thinking of, is designed for low-altitude intercepts. Used against high targets it has a shorter range than the SA-2.

B-52's made about 730 sorties over the Hanoi-Haiphong area in eleven days. They were on North Vietnamese GCI radar all the way in and out, subject to fighter attack. Over 1,000 SAM's were launched, knocking down fifteen B-52's . . . several of which made it back to friendly territory before crashing. From the standpoint of deterrence the message should be clear, that even obsolete models of the aircraft can get close enough to do the job. (None of the "H" models were used.) Can you even imagine the problem of defending a target against a rapidly moving launch vehicle that only has to get within a hundred miles to be lethal—and can fight its way in to that point by using some of its nuclear missiles to clear the way? That kind of problem on the strategic level spells deterrence.

CURTIS L. MESSEX
404 North Fourth Street
Cheney, Washington 99004

To attack Soviet targets, a B-52 would have to penetrate hundreds—if not thousands—of kilometers of defended territory. And while we were turning out B-17's and other bombers on huge assembly lines in World War Two, we are not building new B-52's. Those we lost will not be replaced. And losing three percent of a less-than-500-plane force IN ONE WEEK is unacceptable!

Dear Mr. Bova:

How do we guarantee that there

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won't be another "Vietnam" in Pakistan, the Philippines, or the Middle East (or, more likely) Laos, Cambodia, or Thailand? We do that by legislation. Legislation to curb the President's war-making powers has been offered time and time again in recent years, with varying degrees of success. The most important long-range bill was introduced last year and failed, but it will certainly be introduced again this year, especially with the current prospect of our potential further involvement in Indochina . . . that's the bill supported by liberal Republicans like Senator Javits and conservative Democrats like Senator Stennis as well as the traditional liberal Democratic doves, the bill which would only enable a President to take military action without detailed approval from Congress in emergencies for, I believe, ninety days . . .

The transformation of the office of the Presidency into a neo-monarchy may have begun some years ago, but it's only been under Johnson and especially Nixon that it's acquired frightening proportions. But after all is said and done, are the American people stupid enough to believe a President's image-makers and be lulled into the belief that the President's Always Right against their will and as a result of a superclever propaganda campaign? Who gave Richard Nixon the image he has? Who gave him the power he has? Who's ultimately responsible for everything that happens in this country and everything the government is allowed to do? The people! They knew about the ITT, Watergate, and dozen or so other major "scandals" and yet they voted for Nixon for re-election. Now anytime one of them complains to me about something the Administration's doing I say, "Don't blame me. *You* voted for him. *I* didn't . . ."

LESTER BOUTILLIER
2726 Castiglione Street
New Orleans, Louisiana 70119

In ninety days, a President can commit so many troops to a trouble spot that it would take years to get us uncommitted; the Congress wouldn't have the guts to vote for an immediate pullout, any more than it did over Vietnam. As you point out, WE are the ones who are really in charge, and in a democracy, the people get what they stand for.

Dear Sir:

Your comment, in the May editorial, on the change of Citizen Presidents to God Kings was very interesting. Undeniably this has caused a weakness in the American government—a people lose confidence and self-governing capabilities when the policies and projects of their country are handled with seeming unconcern . . .

One could speculate that perhaps a scandal such as Watergate is precisely what the Presidency needs for the good of the United States. This does bring, if somewhat abruptly, the President and his staff down from a position of, almost, rule by divine right, to that where they are obviously responsible to the citizens. In order to protect the office from corruption and long-term administrative suicide the offi-

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cers must be made aware, if they are not so already, that they and their powers are not omnipotent—and infallible. The days of effective autocracy are long since gone.

I would also like to comment briefly on the stories in the May issue: Jerry Pournelle's "Sword and Scepter" was an excellent story of the mercenary, though the similarities between Falkenberg's troops and Dickson's Dorsai were too many for comfort. It was, however, vastly superior to Dickson's "The Tactics of Mistake" (October-December 1970) in many respects. The characters were less hero/villain cardboard cutouts than the various Dorsai figures (with the exception, of course, of Dickson's "Soldier, Ask Not"), and the faults, not just the virtues, were shown.

To say that the other stories, notably those of George Alec Effinger and Gene Wolfe, deserve as much, if not more, praise would perhaps suffice. But of George R. R. Martin's "With Morning Comes Mistfall" something more must be added. His was a gentle story whose message is unfortunately lost on many people—and not just scientists and technicians. That beauty should never wither and die under the magnifying glass is an important issue. The universe is not of us; we are of the universe and should be humbled by the fact.

P. D. LESLIE

Stittsville, Ontario

But there is a beauty in knowledge, too.

Dear Sir:

A certain story in the May 1973 issue of Analog prompted me to write to your magazine for the first time. That story was "With Morning Comes Mistfall" by George R. R. Martin. In both concept and execution it was, in a word, beautiful.

How strange it is that in a field like science fiction, which often deals with the extension of "myth" into acceptable "fact," there should come a story that tells of the death of a legend. It is not difficult to compare the wraiths of Wraithworld with America's "Bigfoot" or Scotland's "Nessie," but there is a subtle difference in consideration. After reading Mr. Martin's story, who would not sympathize with the view that certain questions should remain unanswered. And yet these same people (myself included) would grow loudly indignant if any romanticist would dare to even suggest that scientific investigation of the Yeti be halted! This story brought to light a curious paradox in human belief. Within all of us there is a Sanders-side and a Dubowski-side, and in the long run the curiosity-driven Dubowski wins. As to whether this is to mankind's glory or loss is the decision of the individual, but we must all be responsible in the end. The most exciting legends never fade away, they die. And sometimes the more persistent ones have to be murdered.

M. P. WOODALL

Route 4, Box 246

Severn, Maryland 21144

Knowledge may kill legends, but knowledge itself can lead to beauty—as the mathematical development of the laws of perspective led to the

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"new" painting styles of the Renaissance.

Dear Mr. Bova:

The standout feature of the May issue was George R. R. Martin's "With Morning Comes Mistfall." I can't say I agreed with the protagonist's philosophy, but this was a beautifully written story. Among other things, it showed that all that is necessary for the creation of a vivid, palpable, believable alien world in science fiction is good (very good) writing. This was accomplished better in this one short story than in (just to give one example) Frank Herbert's novel "Dune," with all its maps and glossaries and appendices.

Both of Martin's stories which you have printed so far have been first-rate. More, please.

MARC RUSSELL
431 South Elm Drive
Beverly Hills, California 90212
More is on the way.

Dear Mr. Bova:

As you have probably heard, the government is seriously considering rationing gasoline in the Los Angeles area to help lessen the smog problem. Europe is already ahead of the United States. Bicycles and electric vehicles are the way of the future. The electric-assisted bicycle has the advantage that it can provide a means of exercise, yet offers power assistance when it is needed on hills.

I put a small electric motor on my bike, and after some experimentation, produced a system that works fine. I'd be glad to send a set of plans for this system to anyone who's interested, for the small price of $2.95.

As you know, electric vehicles operate without any pollution emissions and are really the only true antipollution devices. In order to enhance development in this area, the government should encourage electric vehicles by offering special incentives for inventors and research in this area.

My plans are a start in this direction.

F. J. KIELIAN
130 Drake Avenue
South San Francisco,
California 94080
Electric-assisted bicycles might be a good way to end the congestion and pollution caused by automobiles in most central city areas.

Dear Mr. Bova:

I am thinking of putting together a collection entitled "Hotel Horror Stories" that will include from 1940 through the 1970's. It will be comprised of personal incidences written by the people involved that happened while they were attending a Science Fiction Con.

The reason that I am writing to Brass Tacks is to ask your readers if they have any amusing stories to be included in this volume. If so, they may send them to me at the address below.

WILLIAM "SCRATCH" BACHARACH
8329 Childs Road,
Philadelphia, Pennsylvania 19118
Most fans who have attended SF Conventions have at least one "horror story" to tell. Here's your chance!

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GUEST EDITORIAL
continued from page 8

An opinion sometimes encountered is that the problem is technology itself. I maintain that it is the misuse of technology by the elected or self-appointed leaders of societies, and not technology itself, that is at fault. Were we to return to more primitive agricultural endeavors, as some have urged, and abandon modern agricultural technology, we would be condemning hundreds of millions of people to death. There is no escape from technology on our planet. The problem is to use it wisely.

For quite similar reasons, technology must be a major factor in planetary societies older than ours. I think it likely that societies that are immensely wiser and more benign than ours are, nevertheless, more highly technological than we.

We are at an epochal, transitional moment in the history of life on Earth. There is no other time as risky, but no other time as promising for the future of life on our planet.

Editor's Afterword: While Dr. Sagan did not specifically mention setting up experimental societies on worlds other than Earth, it seems clear that one of the major motivating forces behind interstellar colonization could be exactly that.

After all, the European settlement

IN TIMES TO COME *November's issue features the start of a new serial, "The Sins of the Fathers," by Stanley Schmidt. There are so many goodies in this one, it's difficult to figure out where to begin.*

For example, what's one of the first practical uses that faster-than-light ships will be put to? Astronomical research, of course. Astronomers could, with an FTL ship, ride out to "catch up" with photons from events that happened in the past. A supernova that occurred just before the invention of modern spectrographic instruments would be a natural: astrophysicists could catch the photons and study the event to their heart's content. But when they find something much more frightening than the explosion of a single star, the plot begins to thicken. And, as many a thoughtful person has wondered, when an alien race arrives on Earth and announces that its only desire is "to serve man," shouldn't we wonder about whether they want to serve us boiled or fried?

Joe Haldeman will be back with "We Are Very Happy Here," a sequel to "Hero." It's often been said that you can't go home again. But when the veterans of Earth's first military encounter with an extraterrestrial race return home, they find the world is very different—in different ways. The problems of today are all solved in the wonderful world of the future. Leaving humankind with no problems, right? Don't be silly!

The science article is by George W. Harper, one of the extremely rare men who predicted craters on Mars. It's about what lies out at the fringes of the Solar System, beyond Pluto: Surprises, mostly.

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of America was largely driven by desires to create societies unhampered by existing political, economic or religious constraints. The settlement of the Polynesian islands of the Pacific was apparently similarly motivated, at least in part.

The first star-seeking colonists may well be political, social or religious exiles searching for a New Earth on which they can build their own culture.

It would be simpler to build these mutated societies here on our homeworld, but as Sagan points out, Earth is already too crowded for that hope to be viable. The other planets of our Solar System are so different from Earth, so inhospitable, that mere physical survival on them will be the overriding problem for generations to come.

There may be other Earthlike planets circling other stars. Even if there are not, the kinds of giant spacecraft envisioned by Stine and Sternbach could themselves become miniature universes (an old but worthwhile science-fiction concept) in which these new societies can grow and perhaps flourish.

One major problem remains. Even if new societies can be worked out in starships or on other planets, how can these new social ideas be communicated back to Earth, when the links from star to star take years, decades, centuries—even at light-speed? Will Earth be left behind, culturally, by the star-dwellers? ■

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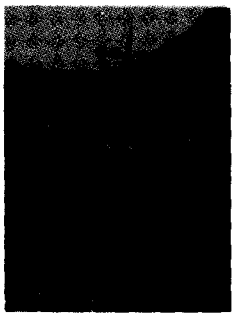

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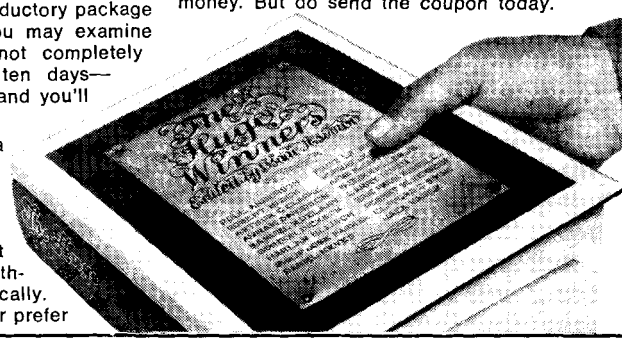

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